Montana Outdoors

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July–August 2006

WOLVES IN MONTANA

Can we make it work?

UNDAUNTED BOTANY

Lewis & Clark's search for plants

Small mammals scurry to safety

ROADKILL NO MORE

Montana Fish, Wildlife & Parks

fwp.mt.gov

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WHAT THE CORPS SAW? Red false mallow blooms along the banks of the Judith River. Meriwether Lewis first collected this previously unrecorded species at the Marias River on July 20, 1806. See page 8 to learn what else he and William Clark discovered. Photo by D. Linnell Blank.

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COVER Wolves are back in Montana. See page 16 to learn what that means to Montanans. Wild wolf photo by Donald M. Jones.

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LETTERS

Native or immigrant?

In the article "Hatchery Pride" (May–June), you refer to rainbow trout as a non-native species. But isn't the rainbow indigenous to northwestern Montana and therefore a native species?

Arnold J. Nelson
Kalispell

According to George Holton and Howard Johnson, authors of A Field Guide to Montana Fishes, *all rainbow trout populations in Montana originated from hatchery stock. The fish you refer to is the redband trout, regarded by ichthyologists—though it hasn't yet been officially classified as such—as a subspecies within what they call the "rainbow trout group." The authors write: "In Montana, populations of native redband trout (also referred to as inland or interior rainbow trout) occur only in a few waters of the Kootenai River Drainage."*

Walleyes rule

I was glad to see your profile of the wonderful walleye in the May–June issue. Are you Montanans finally realizing there's more to life than trout?

Ken Morgan
Sioux Falls, South Dakota

No mention of agricultural contributions

"Saving the Golden Goose" (May–June) sadly fails to point out several facts that cannot be ignored by educated Montanans or newcomers to our state. Montana is a sought-after destination for vacation and living primarily due to our rare scenic beauty, wildlife, and pristine landscapes. What is so often ignored is that one of the main reasons Montana still looks much like it did when the Corps of Discovery first glimpsed it is the careful conservation practices and land stewardship of Montana's agricultural families. This so-called "stagnant" industry is still the largest in the state and is responsible not only for jobs and revenue but also the western heritage and mystique many people associate with Montana.

The frustration of rural families is understandable when the land and resources they have managed for generations draw newcomers here to live, and the newcomers promptly attempt to force these families out of business by criticizing agricultural practices that are not "pleasant" to their urban sensibilities. Yet those same newcomers happily order filet mignon with all the trimmings from our state's farms and ranches, while looking out the window at our spectacular vistas—probably while wearing a cowboy hat and boots.

The doors of ranchers are always open to any newcomers who don't arrive with an agenda that includes doing away with our ranching heritage and way of life, and who have respect for the people who have made Montana the wonderful place it is.

Christie Messer
Helena

Against touching trout

As a fly-fishing guide, I want to thank you for your May–June magazine cover picture of an angler selecting a fly pattern, streamside, amidst a hatch. It is a dramatic picture, one that sparks the angling spirit. It is also one that lacks the trout-in-the-hand shot that has become standard for angling magazines and promotes handling trout before release. That has proven to be unhealthy for trout. Thank you for showing there is so much more to the sport of angling than showing off a fish in the hands. Perhaps this is the beginning of a new trend in fish photography, and my trout brothers will thank you.

Michael McNeilly
Helena

Belt Creek before and after

I enjoyed very much reading the article about Sluice Boxes State Park and Belt Creek ("A Grand Little Canyon," May–June). I am a third-generation Montanan who grew up in Great Falls. My mother's family homesteaded in the Highwood Mountains around the beginning of the 20th century and spent much time in Belt, where my mother was born. In the late 1940s, we used to take weekend camping and fishing trips over Kings Hill to Sheep Creek. Highway 89 went along Belt Creek from the Armington area through Monarch and Neihart and over Kings Hill. We were always bothered to see the contaminated condition of Belt Creek and its turbid, gray waters. Once over the hill and on Sheep Creek, however, we found the clear, cold waters that provided the trout we loved to catch and eat. I remember driving home in a heavy rainstorm and seeing water on the streets in Belt. This proved to be the beginning of the big flood of 1953. Years later, while visiting the area, it was wonderful to see how Belt Creek had become a clear, cold stream similar to our beloved Sheep Creek. Thanks for preserving this very valuable and scenic area as a state park.

Harry M. Johnson
Eureka, California

■ We welcome your comments, questions, and letters to the editor. We'll edit letters as needed for accuracy, style, and length. Mail your letter to: *Montana Outdoors*, P.O. Box 200701, Helena, MT 59620-0701. Or e-mail us at: tdickson@mt.gov.

TOM DICKSON

"It's from the rabbits. They want us to plant more lettuce next year."

Getting Birdy

When most people think of hunting in Montana, their thoughts turn to elk, deer, or pronghorn, or maybe mountain goats or bighorn sheep. But big game is not the only game in town. A growing number of hunters are focusing their attention each fall on pheasants and other upland game birds.

I'm one of them. Of course, I still spend hours in my deer stand during November, and I still get excited whenever I hear a bull elk bugle during bow season. But increasingly I've been spending time with my son and friends out walking the landscape hoping to kick up a rooster or sharptail. One of the things I like best about upland bird hunting is the camaraderie. When you're out on the prairie watching a dog work the cover, you can talk to your fellow bird hunters, kid each other about missed shots, and eat lunch together at a local cafe. Unlike big game hunting, which is usually done on your own, bird hunting is a sociable pastime.

DEA VOGEL

Pheasant numbers increased in many parts of Montana last year, and biologists say 2006 could be a banner year for the upland species.

It's also one that can take you almost anywhere in Montana. The state has a wide range of upland bird species, including Hungarian (gray) partridge, sage and sharp-tailed grouse, and mountain grouse (ruffed, blue, and spruce—also known as Franklin's). You can find upland birds from southeastern Montana's Carter County all the way to the Purcell Mountains in the northwest. Though every upland species has its fans, the most popular bird—and becoming more so each year—is the ring-necked pheasant. I know hunters more secretive about where they hunt roosters than where they shoot trophy mule deer.

In response to the growing interest in bird hunting, FWP's Upland Game Bird Enhancement Program uses hunter license dollars to plant nesting cover, shelterbelts, and food plots that benefit pheasants and other upland species. Begun in 1987, the program also pays landowners to release pen-reared pheasants on qualifying private land. More than 800 landowners have received funding from the program to improve upland game bird habitat while providing public bird hunting opportunities. I'd like to thank them and the many other landowners who continue to provide bird hunting access to the public. If you or anyone you know would like assistance in giving upland birds in your area a boost, please give us a call.

When I was growing up in the Havre area, we hunted the foothills of the Bears Paw Mountains for sharptails and the occasional Hun and sage grouse. Back then, almost no one hunted with dogs; you just walked a few hundred miles or so until something flushed, and then chased the bird yourself if you knocked it down. Today, more and more upland hunters are using pointers and flushers to find birds. It's a thrill to watch a Brittany on a scent trail then lock into a point, or see a Lab come back with a wounded rooster you assumed got away.

I'll always love to hunt big game. But as I grow older, there's something about bird hunting that seems more and more appealing. It may be the social aspect, or the dogs, or the fact that you get to shoot a lot more. Or maybe it's just the fact that when you finally do hit something, it's a heck of a lot easier carrying it back to the truck.

—M. Jeff Hagener, *Director, Montana Fish, Wildlife & Parks*

To learn more about Montana's Upland Game Bird Enhancement Program, call your nearest FWP regional office or visit the program's website at fwp.mt.gov/wildthings/uplandgamebird.

NATURAL WONDERS

Illustrations by Peter Grosshauser

Q. *What's the most brightly colored bird in Montana?*

A. There are so many choices, including the drake wood and harlequin ducks, the rooster pheasant, and the male rufous hummingbird. But if pressed, we'd give that award to the western tanager. With its bright yellow body, black wings, and blaze orange head, the western tanager looks like a bird from the tropics. In fact, tanagers do spend their winters near the equator in Central America, heading north each spring to nest throughout western North America.

Q. *I took a guided fishing trip down the Yellowstone River from Gardiner and passed through Yankee Jim Canyon. Who was Yankee Jim?*

A. James George, known locally as "Yankee Jim," was a colorful bar owner who in the 1870s charged a toll to travelers moving along the narrow wagon road he built in the upper Yellowstone Valley, now bypassed by U.S. Highway 89.

Q. *If I hike with a group, is it more environmentally friendly to walk single file or to spread out?*

A. According
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path. But if you
travel off-trail, it's b
spread out and no
ate a new trail.

Wonder abo
some part of
Montana's nat
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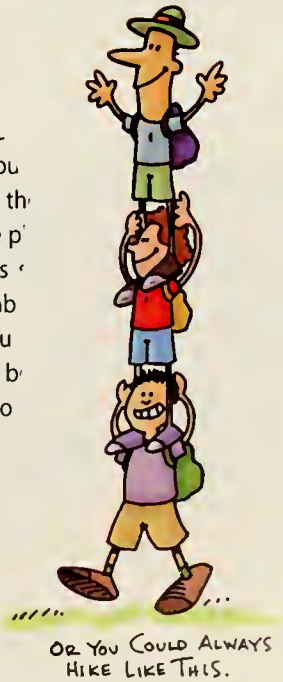


Fishing essentials: rod, reel, modem

Before you gas up the outboard, check waders for leaks, or otherwise prepare for your next fishing trip, turn on the computer.

The single best source for what's happening on Montana's rivers, lakes, and streams is FWP's online Montana Fishing Guide. Established in 2004, the website contains essential information on fish species, access sites, water levels, stocking records, and angling regulations for 600-plus fishing waters statewide.

Another link takes you to the USGS stream flow site, where you can check daily stream flow conditions.

Let's say you want to fish the Big Hole River. The fishing guide site provides a succinct overview of the river and notes the presence of brook, brown, and rainbow trout, arctic grayling, burbot, and mountain whitefish. The guide explains special fishing regulations on the Big Hole, such as catch and release only for grayling and certain restrictions on outfitted floating. It also provides links to the 13 state fishing access sites, showing which have boat ramps, camping, and restrooms.

A link opens an interactive map of the Big Hole River, where you can zoom in on specific river reaches, locate access sites and their facilities, and scout local topography.

Another link takes you to the stream flow site, where you can check daily stream flow conditions and compare them to historic flows. This allows anglers to figure out when spring snowmelt is starting, peaking, or subsiding. Many Montana rivers are unfishable in late spring until after mountain snowmelt.

Lake anglers also can access information on their favorite waters or find new fishing hotspots. The link to Nelson Reservoir, for example, lists the size (4,115 acres), game fish species present, fishing pressure compared to other waters regionally and statewide, and walleye stocking data going back to 1996. A link to the 2006 fish stocking report shows that FWP will stock 100,000 walleye fingerlings reared at the Miles City Fish Hatchery from eggs taken at Fort Peck Reservoir. There's also a detailed, interactive map of Nelson Reservoir showing every bay and point.

Find the Montana Fishing Guide at fwp.mt.gov/fishing/guide/. For a complete list of fishing regulations for all Montana waters, go to to fwp.mt.gov/fishing/regulations/.

MWF

A Montana Wildlife Federation member checks a collection container for discarded fishing line. Roughly 120 containers will be installed statewide by the end of this summer.

A necklace birds can do without

Fishing line is great for catching fish. But birds, pets, and other animals can swallow or become entangled in discarded monofilament and attached hooks. Anglers often end their day on the water with strands of old fishing line pulled from reels. Too often that nondegradable line ends up as litter along lakes and streams.

Since 2005, however, anglers can discard used line at dozens of sites across the state. The Montana Wildlife Federation (MWF), Montana FWP and other state and federal agencies, and the Boy Scouts of America have teamed up to build and install monofilament collection containers at fishing access sites and state parks.

The scouts and MWF members build the collection containers from PVC tubing. FWP and other state or federal agency

HUNTING SEASON OPENERS

DATES TO ASK OFF AT WORK

September

1 Sage grouse, sharp-tailed grouse, mountain grouse (ruffed, blue, Franklin's), Hungarian partridge, mourning dove, fall wild turkey, common snipe, upland birds for falconry

2 Archery deer, elk, antelope

15 Backcountry deer and elk, bighorn sheep, moose, mountain goat, black bear

30 Ducks and geese (pending federal approval)

October

7 Pheasant

8 General antelope

22 General deer and elk

staff install the receptacles at fishing access sites. Agency staff check the containets regularly and send the line to the Berkley Fishing Company, which melts the monofilament and turns the material into nonpolluting underwater fish habitat structures. MWF executive director Craig Sharpe says 58 tubes were installed in 2005 and another 60 are scheduled for installation this summer.

"We're urging local fishing and conservation clubs to consider helping maintain the collection sites," Sharpe says. The MWF will provide free containers as well as postage-paid boxes for sending the used line in for recycling.

For more information, e-mail the MWF at mwf@mtwf.org or call toll-free (800) 517-7256.

Not all bear sprays are created equal

Bear spray can save not just your life, but the bear's, too. Bears that injure or kill humans often have to be trapped and killed. A blast of bear pepper spray may not only deter a bear from attacking, but it may also convince it to shun humans in the future.

Bear spray is proven to be more effective than fireatms at deterring bear attacks. However, spray cans labeled simply "pepper spray" or "for self-defense" may not contain enough of the right ingredients to deter a bear and may just aggravate it. To be sure you purchase effective bear spray, carefully read the label. Most important, the spray must contain at least 7.9 ounces (225 grams) of between 1 and 2 percent of the active ingredients capsaicin and related capsaicinoids. These ingredients disable charging bears by causing massive irritation to the eyes, nose, and mouth and severe breathing difficulties.

DONALDMJONES.COM

USGS

Studies show that approved bear spray is more effective than a firearm at thwarting a bear attack. Even when wounded by a bullet, a bear can still continue charging. But bear spray contains the active compound in chile peppers, which immobilizes a bear long enough for you to escape.

Approved bear sprays are registered with the Environmental Protection Agency and the U.S. Department of Agriculture. Labels on approved bear sprays should list the EPA registration number, manufacturer, and state of manufacture.

"It's also essential that the label confirm that the canister has a spray duration of at least 6 seconds and can spray at least 25 feet," says Chuck Bartlebaugh, executive director of the Center for Wildlife Information, a Missoula-based organization working to reduce conflicts between people and wildlife.

Keep bear spray immediately accessible. Put it in a holster attached to your belt, hiking staff, or backpack shoulder strap. "It doesn't do any good stuffed down deep in your backpack," says Bartlebaugh. Practice taking the canister from the holster and removing the safety clip.

Use the bear spray only to deter a charging or attacking bear.

Bear spray is no substitute for common sense. "Never seek out a bear encounter thinking the spray will keep you safe," says Bartlebaugh. "The best way to keep you and bears safe is to steer clear of bears and prevent an encounter in the first place."

For more information on bear pepper spray and safety in bear country, visit the Center for Wildlife Information website at BeBearAware.org.

SuperTag sales are booming

Hunters appear more than willing to pay for another shot at winning a dream hunt. Sales of Montana's new SuperTag license chances have been booming this summer. As of mid-June, proceeds from the $5 lottery chances exceeded $250,000.

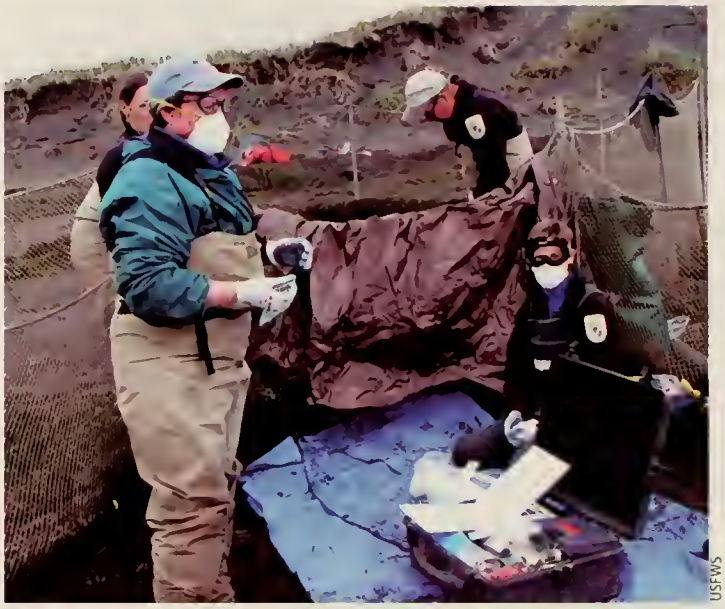
"We've pulled out all stops to get the word out to hunters that these new lottery opportunities are available," says Ron Aasheim, head of the FWP Communication and Education Division. "We've had hunters from as far away as Australia call us about this."

SuperTags are a new opportu-

nity for hunters to win a chance to hunt moose, bighorn sheep, elk, deer, or mountain goats in any Montana hunting district—including the famous limited-entry trophy districts. FWP is offering a total of five SuperTags. Residents and nonresidents may buy unlimited lottery chances.

Proceeds from SuperTag sales are earmarked to enhance hunting access and boost FWP enforcement.

SuperTag chances are available at FWP offices, license providers, and online at fwp.mt.gov. The deadline for entering chances to win moose, bighorn sheep, and mountain goat SuperTags is July 6, and the deadline for deer and elk is August 3.



USFWS

U.S. Fish and Wildlife biologists sample birds for the H5N1 virus as part of a nationwide avian influenza surveillance program.

Searching for sick birds

Montana wildlife disease experts will examine migrating swans, geese, and ducks arriving in late July from Alaska as part of a national effort to detect the possible arrival of a highly virulent strain of bird flu.

"Montana's primary focus will be on migrating birds from breeding areas in Alaska and possibly eastern Russia," says Mark Atkinson, FWP wildlife veterinarian in Bozeman. "Those birds typically start arriving here in midsummer."

FWP staff will work with the U.S. Department of Agriculture and the U.S. Fish and Wildlife Service to carry out the surveillance program. Inspectors will look for the highly pathogenic H5N1, a particularly virulent strain of avian influenza that is easily transmissible between and frequently fatal to certain bird species, especially poultry.

Montana's plan is part of a national response to the possible arrival of the H5N1 avian flu virus in North America. In Asia, Africa, and Europe, the virus has killed wild and domestic birds, as well as more than 120 people who had direct contact with infected poultry.

Inspectors will be looking for the highly pathogenic H5N1, a particularly virulent strain of avian influenza.

Avian flu is spread among birds through contact with secretions and feces of infected birds. It is not easily transmitted to humans. In Asia, most known cases have been linked to those who handled sick birds or infected carcasses.

Last summer in Alaska, the USFWS collected samples from thousands of ducks, geese, swans, and sandhill cranes to test for the H5N1 virus. None of the birds had the disease. A second round of tests is under way in Alaska's waterfowl breeding grounds.

Montana wildlife technicians will collect samples from 2,400 birds—including tundra swans, snow geese, pintails, and mallards—as well as fecal samples where waterfowl concentrate, including urban areas. This fall, wildlife health experts will examine waterfowl harvested by hunters.

FWP will also take samples of sick or dead waterfowl and shorebirds. Citizens are urged to report sick or dead birds at FWP's avian influenza website (see below).

Wild birds are natural reservoirs for more than 140 avian influenza viruses. These various strains naturally occur in wild species and usually cause little or no disease. However, domestic chickens are more susceptible to certain avian influenza viruses, including H5N1. The spread of the H5N1 virus is linked with wild bird migrations, though no one is exactly sure what role migratory birds play.

Public health officials stress that all avian flu is primarily a disease of birds, not humans. "Even if the H5N1 virus is detected early in wild birds in Montana or anywhere on the continent, it would not signal the start of a flu pandemic among people in North America," says Dr. Todd Damrow, Montana's state epidemiologist.

Though there have been no known cases of humans contracting the avian influenza virus from wild birds anywhere in the world, health and wildlife officials urge hunters to use standard precautions when handling game: Cook game bird meat thoroughly to an internal temperature of at least 165 degrees F, wear gloves while field dressing birds, and don't handle dead birds you haven't killed or those that appear sick.

By participating in the early detection effort, Montana will help create a national database that tracks avian influenza information across the United States. Scientists will use the database to better understand how avian influenza viruses move among wild and domestic birds, improve ways to analyze public health risks, and develop better strategies for monitoring the spread of avian influenza.

For more information on wild birds and avian influenza, visit FWP's avian influenza website under "Hot Topics" at fwp.mt.gov. For information on pandemic flu preparations, visit the Montana Department of Public Health and Human Services website at dphhs.mt.gov/pandemic.shtml.

"LAST ONE IN..." Kids cool off at Spring Meadow Lake State Park. The Helena park is one of many statewide holding special events this summer.

DONNIE SEXTON, TRAVEL MONTANA

Dive In! to state parks

This summer promises to be action packed at Montana's 50 state parks. A sample of what's in store is listed below. To see the complete list of events statewide, visit the state parks events calendar on the FWP website at fwp.mt.gov.

TALKS AND TOURS OF THE GREAT FALLS AREA

Giant Springs Heritage State Park, various dates. Throughout the summer, interpretive specialists will present programs interpreting the history of the waterfalls, native plants, and the local history of American Indians, explorers, and settlers. Programs are scheduled for Friday mornings, early Saturday afternoons, and other times. The park also offers Wednesday lunch hour programs and Sunday programs for kids. Topics include bald eagles, bears, John Colter, endangered wildlife species, blue flax, poisonous plants, the giant springs, and more.

Blue flax

Check the FWP website or call the park at (406) 454-5870, 727-1212, or 454-5858.

FORT PECK WALLEYE TOURNAMENTS

Hell Creek State Park, July 15 and 22, August 5. Three walleye tournaments will be held at this remote but starkly beautiful srate park, on the south shore of Fort Peck Lake. The women's fishing tournament and pasture golf tournament is July 15; the Walleyes Unlimited Hell Creek Tournament, open to both sexes, is the following weekend. Two weekends later, it's the kids' chance to show their angling skills at Montana's only youth walleye fishing tournament.

Bannack Days

Check the FWP website or call the state park at (406) 557-2362.

JUMP TALKS

Ulm Pishkun State Park, twice daily on Saturdays and Sundays. Located about 10 miles west of Great Falls, this is the longest pishkun (buffalo jump) in the United States. At these fascinating weekend performances, you'll learn how generations of American Indians used the site to harvest bison.

Check the FWP website or call the park at (406) 866-2217.

CAVERNS CAMPGROUND TALKS

Lewis and Clark Caverns State Park, Friday nights, 8 p.m. Located less than an hour from Butte, Bozeman, and Helena, the park will hosr lectures on fascinating topics throughout the summer, such as the pioneer women of Butte, cave geology, cave bats, female barbershop singing, flying dinosaurs, old-time songs, Lewis and Clark, American Indian legends, stargazing (telescopes provided), cedar flute music, sod shanties, and more.

Lewis and Clark Caverns

Check the FWP website or call the park at (406) 287-3541.

BANNACK DAYS

Bannack State Park, July 15–16. If you've never been to this frontier-era bash, you're missing an essential Montana experience. You and your family will enjoy traditional music, skill and craft demonstrations, staged gunfighrs, and bandits robbing the stage as it enters town—all in Montana's premier ghost town. The park, roughly 15 miles west of Dillon, also offers weekly afternoon lectures throughout the summer.

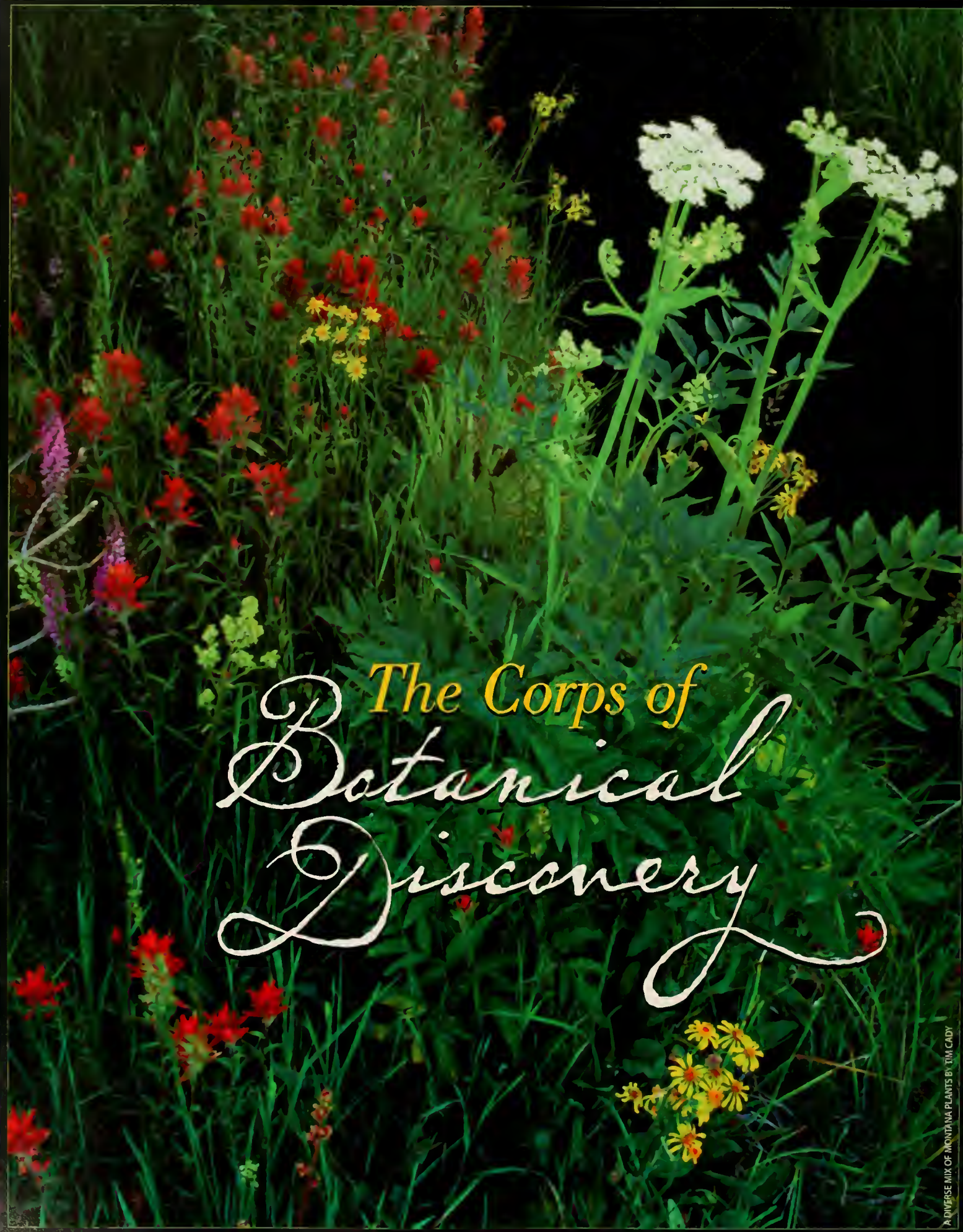
Check the FWP website or call the park at (406) 834-3413.

TOWER ROCK LECTURES AND HIKE

Tower Rock State Park, Thursdays 7–8 p.m. A park ranger will talk about the geology, mining, and history of this newly dedicated state park, located between Helena and Great Falls. On Saturday, July 15, don't miss the chance to join an interpretive specialist and retrace Meriwether Lewis's foorsreps at this historic site.

Check the FWP website or call the park at (406) 454-5870 or 454-5858.

INSET PHOTOS, FROM TOP: CRAIG & LIZ LARCOM; MONTANA FWP; IAN SHIVE



The Corps of Botanical Discovery

A DIVERSE MIX OF MONTANA PLANTS BY TIM CADY

DEPOSITED BY
American Philosophical Society

Lewis and Clark's search for new plants of the West

BY KATHY LLOYD AND DRAKE BARTON

The Lewis and Clark Expedition might be the most famous adventure story in American history. But perhaps because the explorers didn't battle ferocious twin-berry honeysuckle or carve their initials into blanket flowers, their scientific exploits—especially in botany—are less well known than their adventures with wild animals and journeys into unmapped territory. Yet the Corps of Discovery's botanical discoveries are no less important than their escape from grizzly bears and their journey down the Yellowstone River past Pompeys Pillar. Under instructions from President Thomas Jefferson, Captain Meriwether Lewis and other members of the expedition kept a sharp lookout for new plants and discovered at least 85 species never before reported in the United States. The many wondrous plants they found and recorded on the journey not only advanced the scientific study of botany, but also served as food, medicine, and even transportation that ensured the expedition's ultimate success.

Mission impossible?

President Jefferson had many objectives when he dispatched the Lewis and Clark Expedition westward from the United States to explore the newly acquired Louisiana Purchase. In addition to the obvious commercial and expansionist goals, Jefferson's daunting to-do list included exploring and mapping the Missouri River, finding a water route to the Pacific Ocean, studying the native Indians and their customs, and observing wildlife. The president also instructed the explorers to record the minerals (especially metals) they found, keep climate and weather tables, and maintain journals. What's more, he asked Lewis to note "the soil & face of the country, it's growth & vegetable producrions, especially those not of the U.S." and to study the phenology of plants—that is, the dates they bloom, put out leaves, or set seed. And one last thing: Get back safely.

Horticulture and plant study were among the president's personal pleasures. "Botany I rank with the most valuable sciences," Jefferson wrote. Lewis, Jefferson's choice to lead the expedition, possessed an interest in plants and a working knowledge of the eastern United States' flora. In the spring of 1803, Jefferson asked Dr. Benjamin Barton, the leading American botanist of the day, to instruct the captain in botany and the language of technical description. Lewis was a ready pupil and packed several botany books as he embarked on his momentous journey.

One busy day

North and east of present-day Lincoln, Alice Creek flows below Lewis and Clark Pass through wet meadows of blue camas, elephanthead pedicularis, and willows. A short hike up the trail follows the route taken by Lewis, nine men, and their horses as they ascended the pass over the Continental Divide. This was a route recommended to them by various Native Americans, who called it, as Lewis wrote, the "road to buffaloe." The views and flora today are relatively unchanged from 200 years ago, when on July 7, 1806, Lewis described his trip up Alice Creek "through a handsome narrow plain" and crossing the pass as a "low and an easy ascent."

It was a busy 31-mile day for the explorers and, botanically, one of their most productive in Montana. Though undoubtedly consumed with the daily tasks of managing the expedition, Lewis still took time that day to study, collect, and preserve at least seven plants: arrow-leaf balsamroot, blanket flower, common juniper, twin-berry honeysuckle, silvery lupine, silky lupine, and mountain death camas.

Not only did Lewis locate new plants and then learn their characteristics and differences from known species, he also

FROM THE LEWIS AND CLARK EXPEDITION'S COMMON JUNIPER SPECIMEN, LEWIS & CLARK HERBARIUM, ACADEMY OF NATURAL SCIENCES

Moulton 83a
LEWIS AND CLARK HERBARIUM
PH-LC 111: *Juniperus communis* L. var. *depressa* Pursh, Fl. Amer. Sept.: 646. Dec (sero) 1813.
JAMES L. REVEAL (MARY), ALFRED E. SCHUYLER (PH) Jun 1998
Academy of Natural Sciences
Juniperus communis L.
Det: Erica Armstrong Date: 23 May 1994

AMERICAN PHILOSOPHICAL SOCIETY
LEWIS & CLARK, HERBARIUM
FROM THE ATLANTIC TO THE PACIFIC.
! Juniperus Communis L.
Locality.
No. Date

conserved the specimens for transport back to his curious president. Lewis doesn't mention how he pressed his plant specimens, but Dr. Barton likely instructed him in the methods common for the day. Back then, collected plant specimens had to be cared for regularly. Blotting papers were constantly changed to dry the specimens and prevent mold. The Corps of Discovery and its gear often got wet in rivers, creeks, rain, snow, fog, and high humidity. Keeping the baggage dry was an ongoing chore. Lewis probably spent his evening hours—along with his many other scientific duties—studying plants collected during the day, putting them between blotting papers, affixing labels, pressing them between book covers, and recording thoughts and observations in his journal. It took substantial time to collect plants, and keeping the delicate specimens intact over hundreds of miles was an almost impossible task. But Lewis and Clark succeeded. Roughly 230 plant specimens from their expedition still exist.

Essential plants

The expedition encountered many plants on the trip to the Pacific and back that were essential to its survival. One of the most valuable plants was not used for food or medicine but rather to actually transport expedition members.

When the Corps of Discovery left St. Louis, it was equipped with a large, modern keelboat, two roughly 40-foot-long craft called pirogues, and a portable iron boat Lewis planned to assemble later. At Fort Mandan, Lewis sent the keelboat back to St. Louis, loaded in part with plant specimens, and constructed six smaller dugout canoes of cottonwood. The canoes and pirogues carried the crew members and their baggage up the Missouri River to the Great Falls, where a lengthy portage was required. The men fashioned wheels from sliced cottonwood trunks to pull their six canoes and baggage around the falls, leaving the heavier pirogues behind. Once past the falls, finding that Lewis's iron boat "would not answer" (it quickly sank due to a lack of evergreen pitch to seal the skins covering the frame), the men constructed two more cottonwood dugouts. The entire flotilla now consisted of eight craft made of native cottonwood trees.

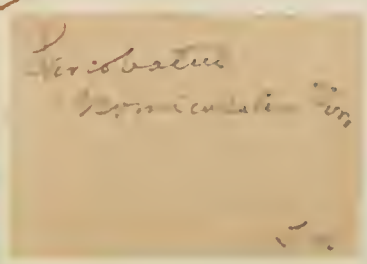
"Scercely able to breath"

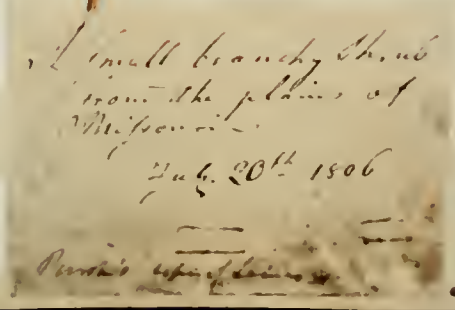
Crossing the Bittertoot Mountains and Lolo Pass in September 1805 almost finished the expedition. Clark recounted the hardships and continued to write even though "I have been wet and as cold in every part as I ever was in my life, indeed I was at one time fearfull my feet would freeze in the thin mockersons which I wore." Numb and nearly starving, having already eaten their extra horses, the party staggered from the mountains onto the plains of Weippe Prairie in Idaho.

The Nez Perce Indians treated the bedraggled company with kindness and fed them "a small piece of Buffalow meat, Some dried salmon beries & roots in different States…which they call quamash." Clark, although grateful for the food, cautioned Lewis "of the Consequences of eateing too much &c." Quamash is blue camas, a member of the lily family with an edible bulb. Its gastronomic effects were discreetly described by Clark: "Capt Lewis & myself eate a Supper of roots boiled, which Swelled us in Such a manner that we were Scercely able to breath for Several hours."

Lewis and Clark both made extensive journal entries about camas, and Lewis also wrote a lengthy description, including cooking methods. Although camas did not rank as one of the expedition's favorite foods, Lewis was not immune to the beauty of its flower. Desctibing a field of camas, he wrote, "the quawmash is now in blume and from the colour of its bloom at a short distance it resembles lakes of fine cleat water, so complete is this deseption that on first sight I could have swoarn it was water."

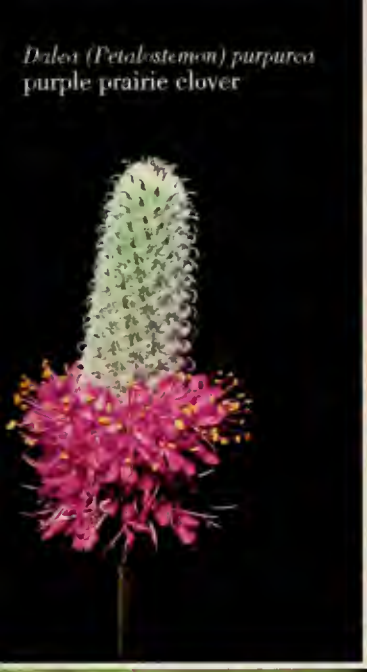
Native people generously introduced Lewis and Clark to other edible plants. The roots of cous bisquit-root, for example, were pounded and formed into cakes, called chapellel or shapelle, which were dried in the sun. Clark commented, "the noise of their women poinding the cows roots remind me of a nail factory." Both camas and cous bisquit-root were major trade items for tribes in the Columbia River drainage.




Moulton 157
LEWIS AND CLARK HERBARIUM
PII-LC 200: Sarcobatus vermiculatus (Hook.) Torr. in W. H. Emory, Not. Mil. Reconn.: 149. 1848.
JAMES L. REVEAL (MARY), ALFRED E. SCHUYLER (PII) Jun 1998
Conservation work on this sheet done as part of Save America's Treasures grant to the Academy of Natural Sciences
Catherine Hawks Conservator 14 Aug 2000
ANSPHILA
Academy of Natural Sciences
Sarcobatus vermiculatus (Hook.) Torr.
var. vermiculatus
Det: Erica Armstrong Date: 18may1994
AMERICAN PHILOSOPHICAL SOCIETY.
LEWIS & CLARK. HERBARIUM.
FROM THE ATLANTIC TO THE PACIFIC.
Sarcobatus vermiculatus Torr.
Locality.
No. Date

Kathy Lloyd of Clancy is president of the Kelsey Chapter of the Montana Native Plant Society and author of abstracts for 31 of the 32 vascular plants Lewis and Clark collected in Montana. Drake Barton of Clancy collects and photographs native plants.

THE LEWIS AND CLARK EXPEDITION'S GREASEWOOD SPECIMEN, LEWIS & CLARK HERBARIUM, ACADEMY OF NATURAL SCIENCES
CLOCKWISE FROM TOP LEFT: NEAL & MUMFORD; MICHAEL J. WOLF; TOM VOGEL; DRAKE BARTON; JEFF VAN TINE; DRAKE BARTON


Dalea (Petalostemon) purpurea
purple prairie clover

Fritillaria pudica
yellow bell

Geum triflorum
prairie smoke

Sarcobatus vermiculatus
greasewood
(Lewis's collection is background of page 10)

Oenothera cespitosa
gumbo evening primrose

Linum lewisii
Lewis's blue flax

Ribes aureum
golden currant

Montana Discoveries

The Lewis and Clark Expedition discovered at least 85 plants new to science. Of those, 32 vascular specimens and one nonvascular specimen were collected in today's Montana. Listed below are the plants collected in Montana (now housed in the Lewis & Clark Herbarium at the Academy of Natural Sciences), who collected each one, where, and when:

Atriplex gardneri (A. nuttallii)
Gardner's saltbush
Lewis: Below the forks of the Marias River, Toole County, July 20, 1806

Balsamorhiza sagittata
arrow-leaf balsamroot
Lewis: Lewis and Clark Pass, Lewis and Clark County, July 7, 1806

Dalea (Petalostemon) purpurea
purple prairie clover
Lewis: Camp Disappointment, Cut Bank Creek, Glacier County, July 22, 1806

Dasiphora (Potentilla) fruticosa
shrubby cinquefoil
Lewis: "Prairie of the Knobs," Ovando Valley, Powell County, July 6, 1806

Elaeagnus commutata
American silverberry
Lewis: "Prairie of the Knobs," Ovando Valley, Powell County, July 6, 1806

Euphorbia marginata
snow-on-the-mountain
Clark: Along the Yellowstone River, Rosebud County, July 28, 1806

Gaillardia aristata
blanket flower
Lewis: West of Lewis and Clark Pass, Powell-Lewis and Clark counties, July 7, 1806

Hesperostipa (Stipa) comata
needle-and-thread grass
Lewis: Between the Dearborn and Sun Rivers, Lewis and Clark County; or Clark: Beaverhead River, Beaverhead County, July 8, 1806

Hordeum jubatum
foxtail barley
Lewis: On White Bear Island, Missouri River, Cascade County, July 12, 1806

Iris missouriensis
Rocky Mountain iris
Lewis: "Prairie of the Knobs," Ovando Valley, Powell County, July 5 or 6, 1806

Juniperus communis var. *depressa*
common juniper
Lewis: Lewis and Clark Pass, Lewis and Clark County; or Clark: Gibbons Pass area, border of Ravalli–Beaverhead counties, July 7, 1806

Lewisia rediviva
bitterroot
Lewis: Along Lolo Creek near Travelers' Rest, Missoula County, July 1 or 2, 1806

(continued on page 13)

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Am... Philos. Hist. Society

Sacagawea introduced the captains to many native food plants such as wild apple and wild licorice root. She also introduced them to yampah, a member of the parsley family that seemed to alleviate the gas caused by blue camas. Lewis wrote, "Sahcargarmeah geathered a quantity of the roots of a speceis of fennel which we found very agreeable food, the flavor of this root is not unlike annis seed, and they dispel the wind which the roots called Cows and quawmash are apt to create particularly the latter."

Lewis's introduction to bitterroot came in August 1805, when the expedition was camped with the Shoshone Indians near today's Lemhi Pass. Lewis studied the dried roots and asked how they were prepared. "This the Indians with me informed were always boiled for use," he wrote. "I made the exprement, found that they became perfectly soft by boiling, but had a very bitter taste, which was naucious to my pallate, and I transferred them to the Indians who had eat them heartily." Lewis collected and pressed a specimen of bitterroot on the return journey while the corps was camped at Travelers' Rest, a few miles south of today's Missoula. Frederick Pursh, a German botanist who reviewed some of Lewis's plant collection, later named bitterroot *Lewisia rediviva* in the captain's honor. The small, attractive plant with rose-colored petals and a "very bitter" root is now Montana's state flower.

Expedition members also ate currants, chokecherries, serviceberries, and gooseberries. During the lean times with the Shoshone, wrote Lewis, "the Chief informed us that they had nothing but berries to eat and gave us some cakes of serviceberries and Choke cherries which had been dryed in the sun; of these I made a hearty meal." While in season, these fresh fruits provided vitamin C that may have helped prevent scurvy among expedition members.

The background of pages 10, 12, and 14 are the actual specimen sheets, including notes from Lewis (copied by botanist Frederick Pursh in 1813), from the Lewis & Clark Herbarium at the Academy of Natural Sciences in Philadelphia. This summer, four specimens from the collection (bitterroot, blue flax, purple prairie clover, and snow-on-the-mountain) will be on display at the Crazy Mountain Museum in Big Timber. For dates and times, call (406) 932-5126.

Eating wild food was generally beneficial, but it could be dangerous. In addition to the gastronomically disruptive camas, other species were to be avoided. Lewis noted, "there are several speceis of hemlock which are so much like the cows [cous bisquit-root] that it is difficult to discriminate them from the cows and we are afraid that they [the men] might poison themselves."

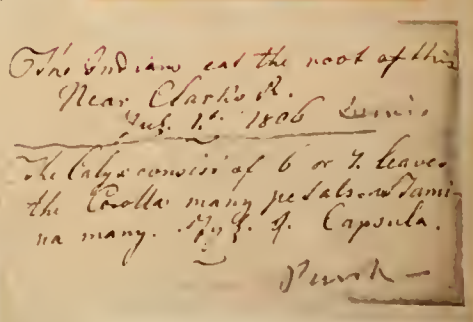
Plant pharmacy

Occasionally, expedition members used native plants medicinally, although they usually relied on medicine they brought from the East. Lewis used chokecherry as an effective remedy when he suffered from "disentary." He recounted boiling small twigs to make a strong decoction that he drank in two doses. The captain wrote that "by 10 in the evening I was entirely releived from pain and in fact every symptom of the disorder forsook me; my fever abated, a gentle perspiration was produced and I had a comfortable and refreshing nights rest."

Jean Baptiste ("Pompy") Charbonneau, Sacagawea's child, was treated with hot, wild onion poultices for a swelling on his neck. Private John Potts accidentally cut his own leg with a knife, and the wound grew painful and inflamed. It was treated, Clark wrote, with "a poltice of the root of Cowes," and later Lewis added, "we applyed the pounded roots and leaves of the wild ginger & from which he found great relief."

Botanical discoveries

Lewis and Clark achieved many of the goals on Jefferson's to-do list during their arduous trek from St. Louis to the Pacific Coast and back. Not least were their


The Indians eat the root of this
Near Clark's R.
Lewis
The Calyx consists of 6 or 7 leaves
the Corolla many petaled Family
na many. Gyn. Dyn. Capsula.
Pursh

Moulton 87

LEWIS AND CLARK HERBARIUM
PH-LC 119: *Lewisia rediviva* Pursh, Fl. Amer. Sept.: 368. Dec (sero) 1813. – Lectotype!

JAMES L. REVEAL (MARY), ALFRED E. SCHUYLER (PH) Jun 1998

AMERICAN PHILOSOPHICAL SOCIETY
LEWIS & CLARK, HERBARIUM
FROM THE ATLANTIC TO THE PACIFIC.
Lewisia rediviva Pursh
Locality,
No. *Date*

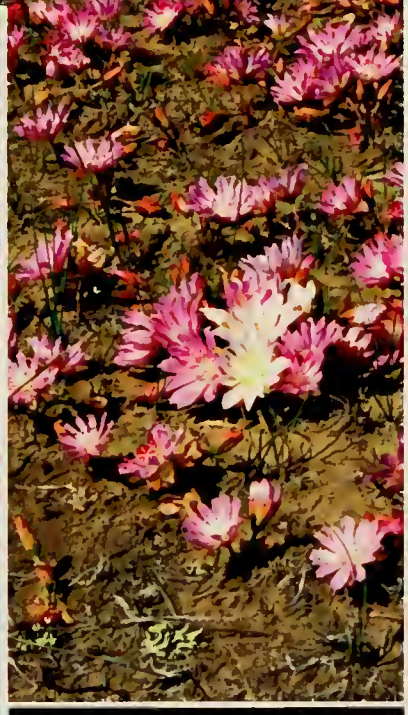
TYPE COLLECTION
Academy of Natural Sciences
Lewisia rediviva Pursh
Det: Erica Armstrong Date: 17 May 1994

ANSPHILA

THE LEWIS AND CLARK EXPEDITION'S BITTERROOT SPECIMEN, LEWIS & CLARK HERBARIUM, ACADEMY OF NATURAL SCIENCES

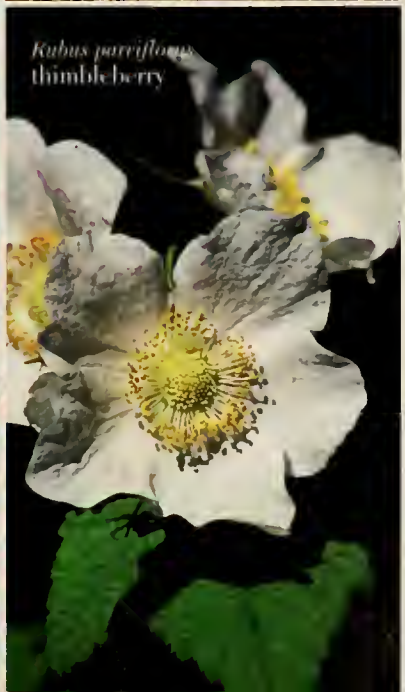
CLOCKWISE FROM TOP: GARY KELLER, DIANE BARTON, MICHAEL J. WOLF, NELS N. KENTER, IV, SANNA GRAFF

Lewisia rediviva
bitterroot
(Lewisia illustration is enlarged on page 12)



Cornus canadensis
bunchberry

Juniperus communis var. *depressa*
common juniper



Rubus parviflorus
thimbleberry

Linum lewisii
Lewis's blue flax
Lewis: Vicinity of the Sun River, Lewis and Clark-Cascade counties: or Clark: Camp Fortunate, Beaverhead County, July 9, 1806

Lonicera involucrata
twin-berry honeysuckle
Lewis: Along the Blackfoot River, Lewis and Clark County, or Clark: Big Hole Valley, Beaverhead County, July 7, 1806

Lupinus argenteus
silvery lupine
Lewis: Along the Blackfoot River to Lewis and Clark Pass, Lewis and Clark County, July 7, 1806

Lupinus sericeus
silky lupine
Lewis: Possibly along the Blackfoot River west of Lewis and Clark Pass, Lewis and Clark County, July 7, 1806

Mimulus guttatus
common monkeyflower
Lewis: Blackfoot River, Missoula County, July 4, 1806

Oenothera cespitosa
gumbo evening primrose
Lewis: Great Falls area, Cascade County, July 17, 1806

Orthocarpus tenuifolius
thin-leaved owl clover
Lewis: Bitterroot Valley near Travelers' Rest, Missoula County, July 1 or 2, 1806

Oxytropis besseyi
Bessey's locoweed
Lewis: Along the Blackfoot River, Powell County, July 6, 1806

Pedicularis cystopteridifolia
fern-leaf lousewort
Lewis: Along the Blackfoot River, Powell County, July 6, 1806

Pedicularis groenlandica
elephanthead pedicularis
Lewis: Along the Blackfoot River, Powell County, July 6, 1806

Philadelphus lewisii
Lewis's mockorange (syringa)
Lewis: Along the Clark Fork River, Missoula County, July 4, 1806

Poa secunda (housed in Kew, England)
Sandberg's bluegrass
Lewis: Possibly near the mouth of Crow Coulee, Chouteau County, July 28, 1806

Populus balsamifera ssp. *trichocarpa*
black cottonwood
Lewis: Bitterroot River near Travelers' Rest, Missoula County, July 1 or 2, 1806

Purshia tridentata
bitterbrush
Lewis: "Prairie of the Knobs," Ovando Valley, Powell County, July 6, 1806

Ribes aureum
golden currant
Lewis: Vicinity of Three Forks, Gallatin County, July 29, 1805

Sarcobatus vermiculatus
greasewood
Lewis: Probably along the Marias River, Toole County, July 20, 1806

(continued on page 15)

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American Philosophical Society

botanical discoveries. Pursh, the German botanist, was the first to publish botanical information about the new plants collected by Lewis and Clark. He mentioned 132 plant specimens from Lewis's collection in his 1813 volume *Flora Americae Septentrionalis*. Today, the vast majority of the specimens collected by the explorers are housed in the Lewis & Clark Herbarium at the Academy of Natural Sciences in Philadelphia. These specimens provide a look at the flora of North America as it was 200 years ago, before exotic plants invaded the West and native plant communities were vastly changed by human activities. The specimens also are being used to compare the greenhouse gas carbon dioxide in modern plants with that in plants from two centuries ago.

It's remarkable, considering the hardships Lewis faced, that any plant specimens survived at all. But it is certain that many more plants were collected than are accounted for today. When the captain reached the Great Falls cache in July 1806, for example, he noted in his journal that every single specimen collected between Fort Mandan and the Great Falls had been destroyed. In typical understatement of what was no doubt a severe disappointment, he wrote, "had the cash [cache] opened...the river having risen so high that the water had penitrated. all my specimens of plants also lost."

When Clark uncovered the cache at Camp Fortunate in July 1806, near today's Dillon, he reported, "I found every article Safe, except a little damp." It is not clear if the specimens from that cache molded and were thrown out, or if they were later lost, but only one plant specimen collected between Great Falls and Camp Fortunate survived: golden currant. In fact, as far as we know, golden currant is the only specimen taken in Montana in 1805 that still exists; all other specimens were collected in 1806. Numerous other plant species were described or mentioned in the journals, and many specimens were likely collected but have since been lost. Nevertheless, what was saved and carried back to the United States resulted in the first major scientific accounting of western plant species. The delicate specimens that remain are testament to the thorough scientific investigation conducted by the expedition's undaunted naturalist, Captain Meriwether Lewis.

Botanists and scholars have known that specimens of 31 vascular plants from Montana existed. But another plant specimen collected here, Sandberg's bluegrass, was recently discovered in storage at the herbarium of the Royal Botanic Gardens in Kew, England. According to the specimen's label, it was collected by Lewis on July 28, 1806. For a detailed look at all the vascular plant specimens from Montana (except Sandberg's bluegrass), visit the FWP website, fwp.mt.gov/parks/lewisclark/plants, or the Montana Native Plant Society, umt.edu/mnps.

Populus trichocarpa, Torr & Gray

Moulton 138

LEWIS AND CLARK HERBARIUM
PH-L.C 175: *Populus balsamifera* L. subsp. *trichocarpa* (Torr. & A. Gray ex Hook.) Brayshaw in Canad. Field-Naturalist 79: 95. 1965.
JAMES L. REVEAL (MARY), ALFRED E. SCHUYLER (PH) Jun 1998

Academy of Natural Sciences
Populus balsamifera L. ssp. *tricocarpa*
(Torr.&Gray) Brayshaw
Det: Erica Armstrong Date: 17 may 1994

Cotton tree of the Columbia River.
Jun: 1806.

ANSPHILA

AMERICAN PHILOSOPHICAL SOCIETY
LEWIS & CLARK HERBARIUM
FROM THE ATLANTIC TO THE PACIFIC

Populus trichocarpa Torr. & Gray

Locality

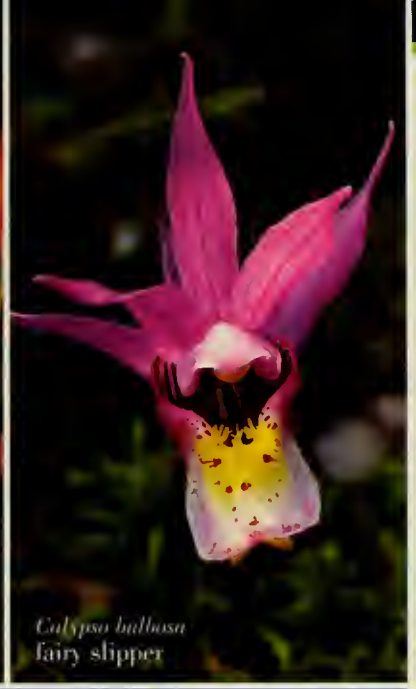
No. Date

THE LEWIS AND CLARK EXPEDITION'S BLACK COTTONWOOD SPECIMEN, LEWIS & CLARK HERBARIUM, ACADEMY OF NATURAL SCIENCES

CLOCKWISE FROM UPPER LEFT: GARY LEE HUNT; STEVEN KAHL; © LYNNELL JEANNE LESTER A. KISH

Prunus virginiana
chokecherry

Hordeum jubatum
foxtail barley



Calypso bulbosa
fairy slipper

Balsamorhiza sagittata
arrow-leaf balsamroot

Sedum stenopetalum
yellow stonecrop
Lewis: Vicinity of Travelers' Rest, Missoula County, July 1 or 2, 1806

Sphaeralcea coccinea
scarlet globemallow
Lewis: Along the Marias River, Toole County, July 20, 1806

Trifolium microcephalum
littlehead clover
Lewis: Bitterroot Valley near Travelers' Rest, Missoula County, July 1 or 2, 1806

Zigadenus elegans
mountain death camas
Lewis: Blackfoot River west of Lewis and Clark Pass, Lewis and Clark County, July 7, 1806

- For several species, various possible collection places are listed. This is done when there is no entry about who collected the species, but modern botanists know the plant grew where both Lewis and Clark were on the date it was recorded as collected. Lewis probably collected most of the species, but Clark also did some collecting, and snow-on-the-mountain was certainly collected by him, since it does not grow where Lewis was at the time.
- The dates "July 1 or 2" are listed because Lewis wrote that he pressed these specimens on July 2, though his labels say July 1.
- Only vascular plants are listed. It is fairly certain that a liverwort was collected in the state, but its identity is still under discussion.

Lewis and Clark probably collected these plants in Montana, but the specimens have been lost:

Allium textile
textile onion
Upper Missouri River, date unknown

Angelica sp., probably *A. dawsonii*
Dawson's angelica
The label is extant; flowering material gathered on Lost Trail Pass on the Idaho–Montana border, Missoula County, September 3, 1805

Mimulus lewisii
Lewis's monkeyflower
Probably on Trail Creek ascending Lemhi Pass, Beaverhead County, August 12, 1805

Phyllodoce empetriformis
red mountain heather
Mountains of Idaho or in the Bitterroot Mountains, Montana, date unknown

Symphoricarpos albus var. *laevigatus*
common snowberry
Journals remark on the fruit; may have collected seeds or specimen (or Lewis, Missouri River), maybe August 13, 1805; or July 1806

Symphoricarpos occidentalis
western snowberry
Between the Musselshell River and South Dakota–Nebraska line, maybe August 1806

WORKING IT WITH

WILD WELCOME

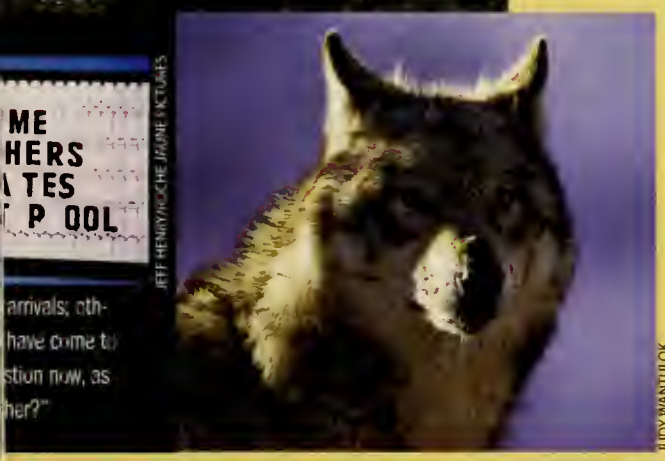
Wolves began moving back into Montana in the 1980s from Glacier National Park and more recently from Yellowstone National Park. Some Montanans and businesses welcome the r
ers wish the wild canids had stayed put. But most peo
terms with the fact that wolves are here for good. The
one rancher put it: "How are we going to live with eac

OUT WOLVES

How Montanans are learning to live with the state's gray wolf population—and teaching the wild canids to live with Montanans

BY TOM DICKSON

DIANE HARGREAVES



JEFF HENRY/ROCHE JAUNE PICTURES

JUDY WANTULOK

Tourists leaving Yellowstone National Park on U.S. Highway 89 can easily see Bruce Malcolm's cattle grazing along the west slope of Paradise Valley, 20 miles north of Gardiner. Unfortunately, so can an increasing number of wolves leaving the park, where the controversial canines were reintroduced a decade ago.

"The first calf we lost was in 1999," says Malcolm, a semi-retired rancher and state representative for a legislative district encompassing 4,000 square miles of mostly federal forest and private livestock operations. "We were at our cabin up on the summer range, and the cows were acting strange, crowding around the yard. The next morning my daughter went riding before work to see if she could find her calf. All that was left was the skull cap and ear tag."

Malcolm can't be 100 percent certain it was a wolf. But he knows wolves will kill calves and that wolves have been nearby. "Every fresh snow we see fresh tracks right down there in the driveway," he says. "Wolves aren't afraid to come onto the property."

For Malcolm and many other citizens, Montana is a different place now that wolves are back. Raising livestock is more challenging. Hunters wonder if deer and elk herds can hold up in the face of wolf predation. Rural residents worry about their safety. Wolf advocates and others welcome the renewed biodiversity wolves bring to the region.

"We know there's a wide range of interests out there regarding wolves," says Jeff Hagener, director of Montana Fish, Wildlife & Parks. "Our job is to manage wolves on the Montana landscape using the best science available, while at the same time responding to the diverse concerns of people who live, work, and recreate in wolf range."

RETURN OF A NATIVE

When European immigrants moved west, they found a region full of wolves. In 1843, while exploring the Missouri River near today's North Dakota–Montana border, John James Audubon wrote that the predators were "extremely abundant" and recorded seeing more than two dozen wolves some days. When their natural foods—bison, deer, and elk—were nearly eliminated in the late 19th century by market hunting and replaced with sheep and cattle, wolves began preying on livestock. Ranchers and government agencies responded by aggressively poisoning, trapping, and shooting the predators. By the 1930s, only occasional nomads from Canada were left.

In the early 1970s, when the public sensed that wolves might disappear from the lower 48 states altogether, the species became one of the first to be shielded by the Endangered Species Act. Wolves began naturally recolonizing northern

Montana from British Columbia in 1979. By the mid-1980s, a few packs anchored western Glacier National Park and established new packs from there. The 126 wolves now spread across northwestern Montana are classified as federally "endangered."

Roughly 130 wolves in Montana's southern "experimental" area range from Lolo southeast to Red Lodge. They descended from the original 66 wolves reintroduced into Yellowstone National Park and central Idaho in 1995 and 1996. The controversial reintroduction came after Congress directed the U.S. Fish & Wildlife Service to recover wolves in what was considered the best remaining habitat in the lower 48 states.

Watching wolf numbers grow and distribution expand, Montana officials knew the population would soon reach federal recovery goals. To meet federal delisting requirements, the state formed a wolf advisory council of ranchers, outfitters, wolf advocates, and other Montana citizens to map out a state management plan. After hosting public meetings statewide and reviewing roughly 10,000 public comments, FWP finished the plan in 2003. The USFWS almost immediately approved the plan, which outlines how Montana aims to fit wolves into a landscape where people live and work, while ensuring the population never falls below 10 breeding pairs—Montana's minimum share of a viable Northern Rockies population.

The USFWS also approved Idaho's plan, but it rejected Wyoming's due to a provision that would allow unlimited numbers of wolves to be killed in most of that state. Because wolves in all three Northern Rockies states are considered a single population, the federal agency has stalled delisting. However, the agency agreed in 2005 to transfer wolf management responsibility to Montana and Idaho. The federal government is currently paying for both states' management activities.

"The agreement is a major step for Montana," says Hagener. "It recognizes that wolves are recovered here, and it begins the transition to long-term conservation."

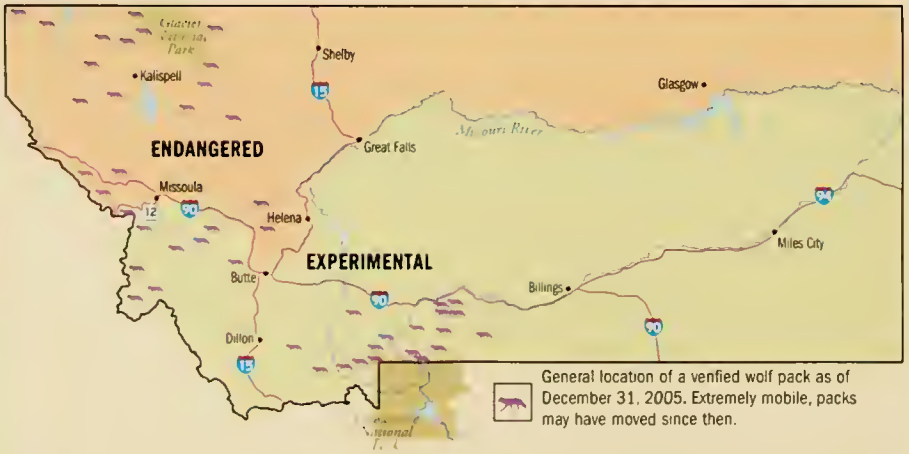
As part of the agreement, FWP has begun carrying out much of the state's wolf plan. Five wolf management specialists across western and south-central Montana monitor the wolf population by documenting pack locations and, when appropriate, tracking individual radio-collared animals. The specialists record pack sizes, reproduction, and survival and note which livestock producers might be affected by wolves.

Last year FWP created a web page where people can report wolf sightings. "We combine that information with aerial, track, and howling survey information to paint a picture of where Montana wolves are and what they are doing," says Carolyn Sime, coordinator of FWP's Wolf Conservation and Management Program. The department also provides information on wolves on its website and at dozens of presentations given throughout the year.

Though Montana now manages the state's wolves, the species remains on the federal list of threatened and endangered species. For now, federal regulations still apply to how landowners may respond to wolves. Those regulations differ depending on where in the state wolves are, a bone of contention with many Montanans.

On private land in the southern "experimental" area (see map, left), landowners or their employees may, under certain conditions, chase off or even kill a wolf that is harassing or attacking livestock or domestic dogs. However, in northern Montana, where wolves are classified as endangered, private citizens cannot haze or kill wolves to protect livestock or dogs.

Two interim federal wolf management areas



Montana wolves are still divided into two different federal classifications, with different regulations. On private land in southern Montana, where wolves are classified as "experimental," landowners or their employees may, under certain conditions, chase off or even kill wolves caught harassing or attacking livestock or domestic dogs. However, in the northern "endangered" area, private citizens may not haze or kill wolves to protect livestock or domestic dogs.

NOTE: *For specific regulations relating to wolves in the two federal classification areas, visit the FWP website at fwp.mt.gov/wildthings/wolf/livestock.html.*

MONTANA OUTDOORS; SOURCE: MONTANA FWP

PERSPECTIVES DIFFER

By tracking pack locations in both areas, FWP biologists have learned that many wolves move past livestock unnoticed. "Wolves walk by cattle and sheep everyday in much of western Montana," says Sime. She adds, however, that some wolves do learn to prey on sheep and cattle. "And for the individual ranchers who lose livestock, it's a very real problem."

How much of a problem is a matter of perspective. According to the U.S. Department of Agriculture, Montana livestock operators reported losing 66,000 cattle last year to disease, birthing difficulties, accidents, and other causes. Of the 3,000 cattle reportedly killed by predators, including coyotes, dogs, mountain lions, and bears, USDA Wildlife Services last year confirmed 23 wolf kills. The actual number is likely several times higher because many calves are never recovered or the cause of death cannot be verified.

"Even if the wolf kill is five times higher

Tom Dickson is editor of Montana Outdoors.

than what is officially confirmed, that's still a miniscule percentage of the overall cattle losses," says Michael Garrity, executive director of the Alliance for the Wild Rockies.

Yet many ranchers maintain that the loss of even a single cow cuts into their bottom line. "We're a small, family-run operation," says Bill Brownlee, who ranches in the Boulder River Valley about 10 miles south of Big Timber. "We can't absorb many losses." He and other ranchers believes wolves also stress cattle, causing weight loss and miscarriages.

Nevertheless, most livestock operators concede that the predators are back in Montana permanently. "Like it or not," says Malcolm, "wolves are here to stay."

DECREASING RISK

Recognizing the inevitable, many ranchers are working with FWP and private conservation organizations to decrease depredation risk. Last year, Brownlee and other ranchers in the Boulder River Valley teamed up with the USDA Natural Resources and Conservation Service and the Bozeman-based Predator Conservation Alliance. The partners hired three "range riders" to patrol cattle herds in the valley from April through October.

Other sheep and cattle ranchers use electric fence, guard dogs, fladry (fence flagging), and sirens to deter wolves and other predators. FWP provides cracker shells and rubber bullets. Such measures help wolves steer clear

WOLVES AND WILD UNGULATES

Now that wolves are reestablished in Montana, hunters, biologists, and others are trying to understand the extent to which the predators affect deer and elk populations.

"So far we've found that impacts vary depending on the location and density of wolves," says Jeff Herbert, assistant chief of the FWP Wildlife Division. "In some localized places, wolves are definitely having an impact on deer and elk. But in other areas, especially where wolf densities are low, the effects aren't really noticeable."

Herbert says weather, habitat conditions, hunting harvest, and other predators (mountain lions and bears) are the main factors biologists consider, along with wolves, when determining what causes herd size and srructure to change.

"We know that wolf predation by itself usually does not initiate declines in prey populations," Herbert says. "But in some cases, it can worsen declines or lengthen the time it takes a prey population to rebound." Not in all cases, however. In northwestern Montana, white-tailed deer numbers have rebounded from the brutal winter of 1996–97, despite the presence of wolves.

In southwestern Montana around Yellowstone National Park, the effects of wolves on elk appear mixed. In recent years, the upper Gallatin and northern Yellowstone elk herds have declined markedly. Since its historic peak of more than 19,000 in the mid-1990s, the northern Yellowstone herd is down to an estimated 10,000 today, smaller than at any rime since the early 1970s.

One reason the northern Yellowstone and upper Gallatin herds are seeing greater wolf predation is that they spend at least half of each year inside the national park boundaries, where wolf and other predator densities are higher. "In agricultural areas outside the park," says Herbert, "wolf density is lower because lethal wolf control is being used to resolve conflicts with livestock. That buffers elk from high rates of wolf predation."

Calf survival for northern Yellowstone elk is down significantly. National Park researchers recently found that increased early season predation is due to the park's growing number of grizzly bears, which key on newborn calves. They also found that wolves prey on calves (and adults) later in the year.

JUDY WANTULOK

CARNIVOROUS CANINES It's true wolves eat elk and deer. But to what effect?

Other elk populations in the region remain stable or have increased, even though wolves are present. "In the Gravelly Mountains and the Madison Basin, elk are still well above our population objectives," says Herbert.

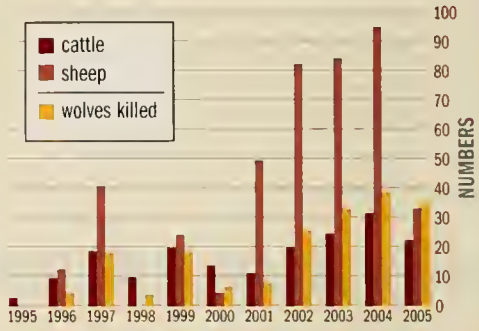
Herbert adds that FWP still has a lot to learn about predator-prey interactions and the long-term implications for wolves and all species that wolves affect. The department continues to conduct research, in cooperation with Montana State University and other organizations, on the relationships between wolves and elk. FWP has also increased elk population monitoring in much of the state's wolf range and is more closely monitoring populations of ungulates such as moose. Other biologists have begun studying relationships between wolves and other predators.

"The more information we gather on how wolves interact with ungulates and other wildlife in the agricultural landscape, the better we'll be able to craft responsible and sustainable wolf harvest regulations in the future," Herbert says.

To learn more about wolves and big game, including the latest research findings on wolf-elk relationships, visit fwp.mt.gov/wildthings/wolfgame.html.

DIANE HARGREAVES

CONFIRMED DEPREDATION LOSSES TO WOLVES
(The actual number is likely several times higher, because dead livestock sometimes can't be found or the cause of death can't be confirmed.)



MONTANA OUTDOORS, SOURCE: USDA AND FWP

TWO-WAY EDUCATION "We shouldn't have to learn how to live with wolves," says one Montana sheep rancher. "Wolves should have to learn to live with us." In fact, both is occurring. With the help of FWP wolf management specialists, livestock operators are finding new ways to keep their cattle and sheep away from wolves, as well as discouraging wolves from going after livestock. (At right, wolf specialist Jon Trapp, standing, helps install fladry, which flaps in the wind and discourages wolves from passing through fencing.) Wolves that don't learn their lesson may pay the ultimate price: In recent years, the number of wolves killed because of livestock depredation has exceeded the number of confirmed cattle killed by wolves.

MONTANA FWP

Wolves that don't learn their lesson may pay the ultimate price....

of humans and livestock.

"Nothing is 100 percent effective," says Sime. "The trick is to find ways to discourage wolves from killing livestock in the first place. We work with producers to find tools that work best for them."

Some wolves learn bad habits that are hard to break. Those that continue hunting and killing livestock often have to be killed.

Unlike coyote losses, ranchers can be reimbursed for wolf depredation. The environmental group Defenders of Wildlife pays 100 percent of fair market value for confirmed wolf kills and 50 percent for probable kills. However, some ranchers think the group's verification process is too strict, and others don't like taking money from what they consider an adversary.

Defenders of Wildlife may end its private compensation program once wolves are delisted. A committee of Montana ranchers, wolf advocates, and public agency representatives recently sketched out a new reimbursement program that would use federal and private funding to pay for prevention tools and reimburse verified losses. Most ranchers say that even though reimbursement can fall short of the true costs, it takes some of the pain out of raising livestock in what has again become wolf country.

JUST ANOTHER CRITTER

Though wolves inspire both fear and reverence, biologists point out that the wild canid is just another wildlife species. FWP has begun managing them that way, by monitoring populations, conducting research, and eventually, according to Montana's wolf management plan, providing regulated hunting seasons. Regulated harvest is a tool that could help balance wolf numbers with private property damage, concerns about human safety, prey populations, and public acceptance of large carnivores.

The mountain lion is an example. For most of the state's history, the large cat could be shot on sight and cashed in for bounty. When the mountain lion was protected as a big game animal under state law in 1971, FWP began regulating lion mortality under a hunting quota system. With regulated hunting, the mountain lion population has improved to the point where both hunters and predator advocates now publicly support the cat's conservation.

"It's hard for some people to understand that Montana's cougar population has benefited from being managed as a big game animal, but it's true" says Sime. "We think it could be the same for wolves."

Some people, however, aren't sure full state management authority would be in wolves' best interests. In addition to concerns over Wyoming's management plan and its legislature's anti-wolf rhetoric, wolf supporters were alarmed when Idaho recently proposed killing up to 80 percent of the wolves near the Montana border, alleging the predators are depressing the local elk population.

"The states don't have a good track record of dealing with endangered species," says Garrity of the Alliance for the Wild Rockies.

"They're still under intense political pressure from hunters and ranchers to eradicate wolves, just like they were 100 years ago."

Hagener insists Montana can be trusted to ensure the long-term health of its wolf population. "Montana's wolf program balances conflicting viewpoints and has strong and diverse statewide support," he says. "We have a solid reputation of effectively managing large carnivores and conserving their populations."

Montana officials continue to strongly urge the USFWS to delist wolves in Montana and any other state that has a federally approved wolf management plan.

"We shouldn't be held hostage by Wyoming's stubbornness," Hagener says.

SURVIVORS, ALL

Meanwhile, the ever-pragmatic Montana ranchers continue to figure out how best to live with wolves. Brownlee says his primary goal is to keep his operation afloat. "I have two young kids, and I want them to be able to stay in the ranching business if they want to," he says.

To that end, the rancher has been doing things he never dreamed of. Last fall Brownlee and other ranchers celebrated the first season of the three-year range rider project they'd developed with the Predator Conservation Alliance.

"Their [the PCA's] board of directors was in town that weekend, so we invited them to our get-together," Brownlee says. "At one point I really couldn't believe it was happening, but there we were, having dinner in the Legion Hall in Big Timber, all of us getting to know one another."

The rancher acknowledges that ten years ago he would have fought the wolf advocates tooth and nail. "But nowadays it makes more sense to sit down at a table and work things out," he says.

Brownlee points out that ranchers have always adapted to change. "We adapt to changing weather, we adapt to changing markets, and now we're adapting to wolves."

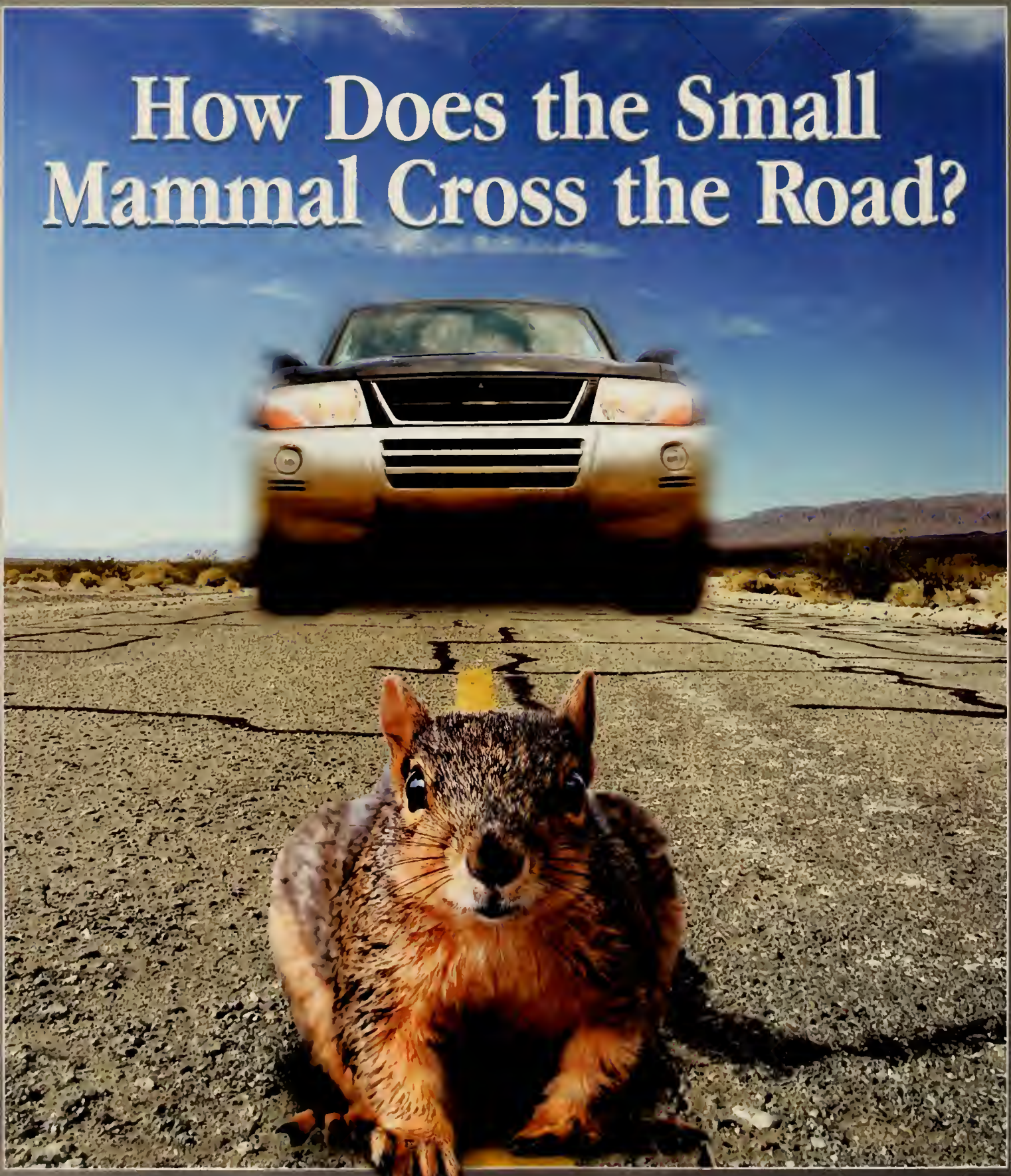
The 2005 Montana Gray Wolf Conservation and Management Annual Report contains additional information about ongoing wolf management, including summaries of the state's verified wolf packs. To read the report and other wolf-related information, including details of regulations in the state's two federal wolf areas, visit fwp.mt.gov. For USFWS information on Northern Rockies wolves, go to http://westerngraywolf.fws.gov.

CAROL POLICH

MANAGING THE BIG PICTURE Though state wildlife officials are still learning about wolves and the predators' relationship with elk, deer, and other wildlife, they say one thing is certain: If critical Montana habitat continues to be lost to overdevelopment, there will be fewer places for all wildlife to live.

"The department continues to focus on conserving prime elk and deer habitat by purchasing conservation easements and encouraging the use of managed grazing systems," says FWP director Jeff Hagener. "If we don't have good winter range and other habitat, we won't have deer and elk, and that means we won't have wolves, either."

How Does the Small Mammal Cross the Road?



Hint: the answer is under the asphalt.

BY KERRY FORESMAN

A new UM study shows how shrews, voles, and other tiny travelers can move underneath Montana's growing number of highways

To meadow voles, Columbian ground squirrels, and many other small mammals, a highway is a sea of pavement, the opposite shore far from sight. As Montana's highway system expands, those seas are widening. For example, the current expansion of U.S. Highway 93 through the Bitterroot Valley south of Missoula to four lanes has created a 90-foot-wide swath of pavement and shoulder that many small animals attempt to traverse. (For a person, that would be like trying to run the length of four asphalt football fields.) Not only do meadow voles and other small mammals move slowly on short legs, they have to dodge high-speed vehicles and avoid predators that can see them clearly on the flat surface. Highways and wildlife don't mix well.

States don't record the number of small mammals killed each year on highways, but many document collisions between deer and vehicles. Michigan, for example, reports roughly 35,000 deer collisions per year, resulting in about 1,500 human injuries. The Insurance Institute for Highway Safety estimates that 1.5 million wildlife collisions occur yearly in the United States, totaling $1.1 billion in property damage. According to the U.S. Department of Transportation, approximately 200 people die each year nationwide in vehicle collisions with animals, which also cause nearly 30,000 injuries.

Most of this damage comes from deer, not deer mice. But statistics indicate the trouble larger mammals have negotiating highways and the damage caused to both animals and drivers. Considering that small mammal populations vastly exceed those of large mammals, it's likely that vehicles kill millions of small animals each year. What's more, insurance and injury figures don't factor in the many accidents caused by drivers swerving to avoid squirrels, marmots, and other small mammals crossing the pavement.

The harm that highways cause wildlife will worsen. Montana has built or widened several highways over the past decade, such as Montana Highway 56 near Libby. Plans are in place to widen Montana Highway 83 between Clearwater Junction and Seeley Lake and several other highways.

Additional roads don't only cause more wildlife deaths. They also fragment wildlife habitat into smaller and smaller pieces. Grizzly bears, elk, and other big mammals need large, contiguous parcels of habitat to survive. But smaller mammals also suffer when their habitat it broken up, especially small wetlands. A short-tailed weasel, for example, hunts throughout a wetland to find enough prey to survive. Other small species that live in wetlands and woodlands are harmed by highways cutting through their habitats.

In 2000 the Montana Department of Transportation (MDT) began planning to widen U.S. Highway 93 to handle increasing traffic in the Bitterroot Valley. Framed by the Bitterroot Mountains to the west and the Sapphire Range to the east, the lush valley has seen a housing boom over the past 20 years. The area is also home to many small but productive wetlands. At public meetings held to discuss the proposed high-

KERRY FORESMAN

The author, a UM professor, holds a short-tailed weasel caught as part of the study in wetlands (above) off U.S. Highway 93.

I jumped at the chance and thus began three years of collaborative research.

way, citizens voiced concern about possible damage to wetlands and small mammals.

No feasible way existed to prevent the highway from bisecting wetlands. But MDT biologists thought there might be a way to facilitate the movement of wildlife from one side of the highway to the other. When a highway is built in wet areas, engineers place small, 4-foot-diameter drainage culverts under the pavement to allow water to move unimpeded after rain and spring snowmelt. If water levels are low, small animals can run through the dry culverts, avoiding the vehicles above. But even a few inches of water in the culverts prevents small animals from using these tubular transportation corridors.

To solve the problem, MDT biologists designed long, metal shelflike platforms and placed them inside the culverts. The idea was that mice, skunks, badgers, and other small mammals could use the culverts even when water was present. Pat Basting, an MDT biologist, asked me if I could help him learn whether small mammals would actually use the shelves. I jumped at the chance and thus began three years of collaborative research.

The main questions I hoped to answer with the study were: Which species lived in the wetlands next to the highway? Which, if any, would purposely move through these small culverts? And which of these mobile species would adapt to walking on the shelf above flowing water rather than take their chances dodging vehicles above ground?

Kerry Foresman is a professor of biology at the University of Montana specializing in small mammals. He is the author of The Wild Mammals of Montana.

I opened the tube door and was thrilled at what I saw inside—hundreds of black sooty vole tracks covering the contact paper...

Habitat fragmentation caused by highway growth has become a growing issue across the country. Believing this study would be a great way to enhance their future careers, I selected several talented undergraduates to help me and my technician, Jeremy Moran.

To learn which species lived in the immediate area, we placed a line of small live-traps next to the entrances of our three study culverts, located about 10 miles south of Missoula. We mounted remote cameras inside the culverts. Triggered by body heat and motion, the cameras photographed any animal moving along the corridor.

The traps showed us which species lived in the area and had the opportunity to use the culverts. The cameras told us which species actually used the culverts.

For nearly three years, we trapped 2,200 animals comprising 18 different small mammal species living in the wetlands. It turned out that many of these species did not use the culverts. After examining 4,500 photographs, we learned that house cats were the most common animal traveling in the metal corridors. In the 3-mile highway study section, we identified 12 different cats from neighboring homes traversing the culverts after dark. They were probably hunting mice and voles throughout the meadows before they went home for the night. We also saw many deer mice, raccoons, and striped skunks.

Another surprise: Few smaller species actually walked on the shelf, and then only on the frame and not the metal mesh floor. To learn why, we installed video cameras in the culverts. The cameras showed that the original 1-inch-square metal mesh floor had too much space to provide good footing. Watching mice was like watching a person trying to walk along railroad tracks. The tiny mammals would either turn back or run down the solid metal frame supporting the floor.

We began testing a variety of different floor materials. After a year of installing materials and reviewing thousands of photographs and hundreds of hours of video, we found a durable, fine-mesh floor surface that most species would use but still allowed water to pass through when water levels in the culvert rose.

We also redesigned the entrances to the shelves so that animals could reach them

The researchers were surprised to learn that house cats were the most common animal to use the original shelf design. Two red squirrels scamper along the finer mesh of the final shelf design. A porcupine lumbers along a shelf, cars and trucks on U.S. Highway 93 buzzing overhead. Of the 18 species inhabiting the adjacent wetlands, 14 used the culvert shelves the researchers modified during the three-year study.

from the side of a culvert entrance rather than directly in front of the entrance. In the original design, the ramp we built leading up to the shelf turned out to impede water flow.

One problem we hadn't solved was how to encourage meadow voles to use the culverts. Meadow voles were the most common mammal caught in our live-traps, yet they never showed up in photographs taken from inside the culverts.

Meadow voles evolved to live in tiny tunnels they make in grassy meadows, where they can hide from raptors such as kestrels. The entrance to the culverts, as well as the culverts themselves, apparently were too open for a vole's comfort. Yet we knew that voles were mobile and they probably needed to move to the other side of the highway.

We reasoned that they might feel comfortable entering and running through a narrow tube placed within the culvert. As an experiment, we bought 180 feet of rain gutter downspouts, which we taped together and hung in a culvert under a shelf. To make sure the voles could get into these tubes, we built a funnel extending sideways from the culvert entrance out into the grass cover.

To determine whether voles actually ran through the tubes, we used a tracking plate I'd developed several years ago to survey small forest carnivores such as American martens. The plate is covered in soot and surrounded by sticky contact paper that shows the tracks of animals running over it. We put the plate in the middle of the 180-foot-long tube, cutting a door in the side of the tube so we could see what transpired. I

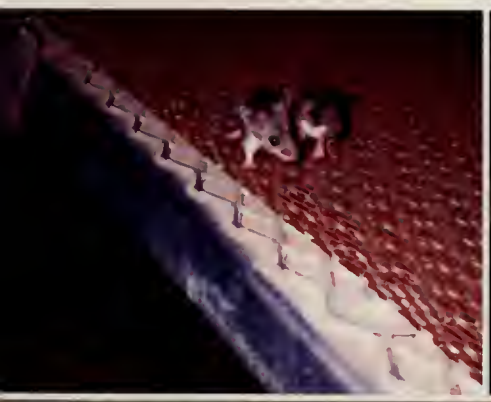
...Not only had voles used the tube, but overnight it had become a veritable vole highway.

was so curious about whether or not the tube would work that I drove to the study site early the next morning and hurried hunched over down the culvert. I opened the tube door and was thrilled at what I saw inside—hundreds of black sooty vole tracks covering the contact paper. Not only had voles used the tube, but overnight it had become a veritable vole highway. (Later we learned that other small species also used the tubes, notably short-tailed weasels.)

With the design complete, I then worked with the company that made the culverts and shelves, Roscoe Steel & Culvert Co. of Missoula, to create new shelves and vole tubes for final testing. After installing these devices, my technician, students, and I analyzed several thousand additional photographs to learn what other small mammals used the new shelves in the culverts as transportation corridors. In the end, we identified 14 species, from shrews and deer mice to raccoons and even porcupines.

The shelves are so effective in allowing small mammals safe passage under highways that the University of Montana and Roscoe Steel now jointly hold a patent (see roscoebridges.com/prod_critter_crossing.html) on the device, which has garnered considerable interest from highway departments in other western states and Canada. We also designed the shelves to be installed in existing culverts, so agencies and counties don't need to wait for new construction before helping conserve small wildlife living along highways. Keeping in mind cost, we designed a shelf that will extend within a culvert under four lanes of highway to sell for less than $5,000. MDT has recently provided guidelines for the state suggesting that these structures be routinely considered, where appropriate, for all new highway construction.

The hazard of highways to wildlife is nothing new. Nearly 70 years ago, New York forester James Simons published the classic book *Feathers and Fur on the Turnpike*, the first analysis of the problem of wildlife mortality on highways. However, not until the 1980s did biologists begin seriously studying the subject. Most research has been on deer, elk, and bears. In parts of North America, such as in Banff National Park, over- and underpasses have been built to allow large animals to move from one side of a highway to the other. Now we know there are ways for small mammals to cross (under) the road, too.



PHOTOS BY KERRY FORESMAN

A pair of deer mice move through the culvert underneath the highway. A muskrat pauses to feed while on a shelf submerged in flood water. Without the shelves, most small mammals would not use the culverts when filled with more than a few inches of water. A short-tailed weasel makes its way home. The University of Montana researchers also learned that weasels and meadow voles prefer to travel through plastic tubes strung under the shelves.

DODGING A BULLET Though widespread in Montana, the black-tailed prairie dog was petitioned for listing in 1998 as a federally threatened species because it was disappearing elsewhere in its range. Though the U.S. Fish & Wildlife Service eventually decided to not list prairie dogs, the possibility continues for other species in Montana to become federally threatened or endangered. That has persuaded some landowners to begin working with state and federal conservation agencies to conserve critical wildlife habitat.

TIM CHRISTIE

Avoiding the ESA Ambulance

Why more landowners are working with FWP to keep Montana wildlife from ending up in the Endangered Species Act emergency room

BY ANDREW MCKEAN

The fastest way to start a fight in many parts of Montana is to walk into a tavern and praise the Endangered Species Act. In bars and around kitchen tables throughout the state, the federal law created to recover endangered species is often cursed, vilified, and even considered a type of government-sponsored land grab.

Montana Fish, Wildlife & Parks officials say they understand why people may view the environmental law with such disdain. "The ESA can be intimidating for some landowners who, whether it's justified or not, fear losing control over their property and livelihood," says Chris Smith, the department's chief of staff. But Smith also says the ESA, established in 1973, is having positive consequences—though maybe not as the law's authors envisioned.

One example is the Big Hole River, home to the lower 48 states' last intact river-dwelling population of arctic grayling. It's likely the Big Hole's grayling will soon be listed as federally endangered. Over the past several years, FWP biologists have been working with ranchers and other Big Hole landowners who use water from the river to enact specific water conservation measures that benefit the fish. With state and federal funding, landowners who have entered into what are called Candidate Conservation Agreements with Assurances (CCAAs) for arctic grayling are retrofitting headgates, fixing leaky irrigation ditches, and even changing watering schedules to benefit the fish. In return, the U.S. Fish & Wildlife Service has agreed to not impose stricter regulations if the grayling becomes listed as an endangered species.

"The Endangered Species Act can be good for conservation, but not always in the ways it was intended," says FWP's former Native Fish Program manager Bob Snyder (now head of the department's hatchery system), who has worked with local biologists to establish the federal conservation agreements with Big Hole landowners.

"Many landowners conserve wildlife habitat on their own, but some have told us it took the likelihood of federal listing to convince them to meet with FWP and the USFWS."

Snyder explains that the ESA's purpose is to stop wildlife from becoming extinct. Yet too often, once a species is listed it can be nearly impossible to restore populations to previous numbers. "We prefer to work with landowners to conserve critical habitat for a whole community of species before the most imperiled member of that community is listed as endangered," he says. "That's the best way to keep the landscape healthy, to conserve as many species as possible, and to ensure no species becomes extinct—or even becomes listed."

"The Endangered Species Act should reward landowners for having healthy wildlife habitat, but instead it penalizes the very people who have been the best conservationists."

Snyder says many landowners are already doing what's right for wildlife. But for some, he says, it takes additional incentives to convince them to work with conservation agencies: "The ESA looming out there in the distance is often that incentive."

Andrew McKean manages FWP's Regional Information and Education Program in Glasgow.

THE LIST

The Endangered Species Act was passed overwhelmingly by Congress in 1973 as the federal government's primary tool to stop wildlife species from becoming extinct. The act, an expression of the global environmental movement of the late 1960s, has had some high-visibility successes, notably the recovery of the peregrine falcon. The ESA is also credited with boosting grizzly bear numbers in the Greater Yellowstone Ecosystem to the point where that population is being considered for removal from federal protection. However, most species listed as threatened or endangered remain on the list—even, as is the case with bald eagles, when populations are thriving. Currently the USFWS, which manages federally listed species, counts roughly 1,000 U.S. species as endangered (a species "in danger of extinction throughout all or a significant portion of its range") or threatened (a species "likely to become endangered within the foreseeable future"). Another 280 species are listed as "candidates" (there is evidence the species could become extinct) for joining the list.

Though reviled by some, the ESA remains widely popular among most Americans. Several federal lawmakers have proposed eliminating or changing the law, but nationwide public support would make any significant changes difficult.

The USFWS tries to stem a listed species' population decline by using regulations that limit harm to the animals or their habitat, such as by restricting development. Because private property rights limit government intervention, the federal government's main ESA enforcement tool is to withhold or impose conditions on permission for activities on federal land. The USFWS may also modify any project—even those on private land—that receives federal funding if the project might harm a federally listed species. In other words, only if a landowner receives something from the federal government, whether it's a farm subsidy payment or a permit to drain wetlands, can the government require that the landowner not harm threatened or endangered species. In Montana, this can include limiting livestock grazing on Bureau of Land Management and U.S. Forest Service land, reducing irrigation from federally funded water projects, and restricting or even prohibiting road or subdivision construction in areas containing critical habitat for listed species.

FEDERAL STICK, STATE CARROT

Chris Smith, FWP chief of staff, says the federal "stick" needs to be balanced with positive motivators, such as by financially rewarding conservation practices already taking place on private land.

"Most landowners in Montana are good stewards of the land," he says. "In many cases, they've inherited well-managed property and want to pass that conservation legacy to future generations. They have a deep interest in preserving the quality of the habitat and species distributions. We in FWP have those same interests. That's why it makes sense to work together toward our shared goal—keeping common species common and making sure declining species

ENDANGERED MEANS THERE'S STILL TIME President Richard M. Nixon signed the Endangered Species Act into law in 1973. "Nothing is more priceless and more worthy of preservation than the rich array of animal life with which our country has been blessed," he wrote. Since then, more than 1,000 species have been listed, but only 12, including the peregrine falcon, have recovered and been removed from the list.

EXTINCT
Phantom shiner

ENDANGERED
White sturgeon

THREATENED
Water howellia

CANDIDATE
Yellow-billed cuckoo

RECOVERED and DELISTED
Peregrine falcon

PAT CLAYTON / FISHEYEGUYPHOTOGRAPHY.COM

DYING FOR WATER The combination of long-term drought and the removal of water for irrigation has been a double whammy for Big Hole River arctic grayling. Recently many area ranchers have agreed to use less water in exchange for protection from stricter federal regulations if the grayling becomes federally listed.

have intact critical habitat."

FWP uses incentive programs to provide an economic benefit to landowners who participate in conserving critical habitat, such as sagebrush. Sage-grouse, regularly petitioned for ESA listing, require large expanses of sagebrush for food, nesting, and shelter. "If market forces related to livestock production create an incentive to convert sagebrush to a cultivated field or burn sagebrush to increase the grass base," says Smith, "then we need to have a more attractive incentive for landowners to keep sagebrush habitat intact."

FWP's Sagebrush Initiative matches federal funds with hunters' license dollars to pay landowners up to $12 per acre to protect sagebrush habitat for up to 30 years. As more landowners sign up for the voluntary sagebrush habitat conservation program, USFWS investigators may decide the sage-grouse doesn't need federal protection.

FWP and federal conservation agencies also maintain programs that pay landowners to conserve waterfowl habitat, improve fish habitat, and protect entire landscapes through conservation easements. FWP officials are now looking to see if a new federal funding source, State Wildlife Grants, may be used to provide financial incentives for landowners to conserve habitat landscapes that support an even wider variety of wildlife, from salamanders to prairie fish.

STATE OR FEDERAL RESPONSIBILITY?

Any discussion of endangered species management raises a fundamental question: Who's responsible for ensuring animals and plants don't become extinct?

Proponents of the Endangered Species Act say the federal government is often best equipped to protect wide-ranging endangered species. They point to the federal ban on DDT, for example, as essential to the peregrine falcon's recovery. If protection were left to individual states, argues Kieran Suckling of the Center for Biological Diversity, peregrines and many other species might now be extinct.

"When species cross state or national boundaries, it is much easier for the feds to coordinate recovery efforts," he says.

Federal protection may be necessary for species on the brink of extinction that move great distances across jurisdictional boundaries. But some states and individuals maintain that federal authority over a species may not always be in its best interest. For example, the ESA can work as a disincentive to conserve habitat and the species that depend on it. That's the opinion of Ken Blunt, a Malta realtor and rancher who has worked on black-footed ferret, prairie dog, and sage-grouse issues in his community.

"The Endangered Species Act should reward landowners for having healthy habitat, but instead it penalizes the very people who have been the best conservationists,"

CALPHOTOS.NET; KRISTI OUBOIS; ISTOCKPHOTO.COM; ISTOCKPHOTO.COM

says Blunt. He argues that landowners whose property harbors the last population of an imperiled species suffer disproportionate restrictions compared to landowners whose poor conservation practices led to the species' decline. "People need to be rewarded for having and preserving good habitat," Blunt adds. "With sage-grouse, for instance, ranchers who conserve the best private habitat should be given a reduced price for grazing leases on BLM land."

Some states maintain they too are unfairly punished by the federal government for maintaining healthy populations of species in trouble elsewhere. Montana contends that it holds healthy populations of grizzly bears, gray wolves, sage-grouse, bull trout, and prairie dogs. However, because these species have disappeared from other states, federal restrictions either have been or threaten to be imposed on Montana.

"The goal should be to avoid an ESA emergency. That's why we're advocating preventive care with landowners."

In 2004, frustrated that the federal government was delaying removal of gray wolves from the endangered species list, FWP director Jeff Hagener wrote to the USFWS and strongly requested that it delist on a state-by-state basis.

"I told them that if they didn't delist in states like Montana that had done a good job of either conserving or restoring species, then the states would have no incentive to work with the feds on these or any other endangered species," Hagener says.

THE ESSENTIAL LANDOWNER

FWP's frustration with the ESA has not lessened the department's commitment to protecting threatened and endangered species. In fact, it has strengthened ties between FWP and Montana landowners. That cooperation is essential for endangered species conservation because more than 60 percent of Montana is in private ownership. What landowners do on their property greatly affects wildlife.

No conservation or management discussion can afford to omit landowners, says Mike Aderhold, who retired last year as supervisor of FWP's north-central region. In his briefcase, Aderhold keeps a tattered rag of paper containing a 1931 quote from Aldo Leopold, the famous conservation pioneer. "Recognize the landowner as the custodian of public game on private lands, protect him from the irresponsible shooter, and compensate him for putting his land in productive condition," reads part of the quote. "Make game management a partnership enterprise to which the landowner, the sportsman, and the public each contribute appropriate services, and from which each derives appropriate rewards."

Aderhold says he would sometimes hand the paper to a rancher engaged in a seemingly intractable debate with FWP officials.

"The quote is a reminder of the essential common interests shared by landowners, wildlife biologists, and conservation-minded citizens," Aderhold says.

ENDANGERED HEREFORDS? Economic threats to the ranching economy and tradition have long concerned conservation leaders who believe in rewarding healthy land stewardship. "Recognize the landowner as the custodian of public game on private lands," wrote Aldo Leopold, "protect him from the irresponsible shooter, and compensate him for putting his land in productive condition."

SPARTASPHOTO.COM

Aderhold points out that ranchers and farmers throughout western Montana are under intense economic pressure, which in turn puts pressure on wildlife habitat. Commodity producers statewide struggle to remain solvent in the face of rising energy costs and stagnant market prices. Just to break even, ranches and farms need to increase in size and productivity. That means plowing more prairie, irrigating more bottomland, and grazing more cows—all practices that can endanger certain native wildlife species. The alternative often has been to sell the property for trophy home subdivisions—which fragment habitat and increase fencing that blocks wildlife movement.

Yet there are other options. FWP buys conservation easements on some ranches containing critical wildlife habitat. And sev-

GAME CHANGE? As in Alaska today (photo below), Montana had a long history of holding carefully regulated hunting seasons that maintained healthy grizzly bear populations. But after the species was declared federally threatened in the lower 48 states, Montana was forced to end hunting because antihunting organizations successfully petitioned a federal court to halt the season. Sage-grouse, bull trout, and westslope cutthroat trout are other Montana game species for which federal listing can restrict harvest opportunities.

FROM LEFT: WILDALASKANGUIDES.COM; DONALDMJONES.COM

eral state and federal programs provide compensation for good land stewardship. Smith says FWP continues to explore new ways of providing economic incentives to reward wildlife-friendly land-use practices. He and other FWP officials encourage landowners to work with the department to find new ways to mitigate major forces now affecting both wildlife habitat and traditional agricultural economies.

"Montana is at an ecological crossroads," says Smith. "Time is running out on our ability to proactively conserve large-scale landscapes—both for wildlife and for ranching. We urge landowners who share FWP's conservation ethic and conservation groups concerned with wildlife habitat and livable communities to work with us to figure out how to manage the rapid land-use changes across much of the state."

Smith points to real estate development in western Montana that is turning working ranches and wildlife habitat into shopping malls and housing complexes. Global warming is accelerating threats to species such as arctic grayling that evolved in cooler climates, putting additional pressure on landowners who share water with the increasingly rare fish.

"We need to act now before things worsen," he says.

Smith and other FWP officials believe it's essential for Montana to conserve its most critical landscapes, such as the foothill grasslands that support not just elk and mule deer but also potentially endangered species such as the pygmy rabbit. "It makes biological and economic sense to conserve large, critical habitats before the wildlife species that use them become threatened or endangered," says Smith. By looking at the big picture of large-scale habitat protection, he says, Montanans can focus on their common interest in saving forests, grasslands, and rivers as well as the wildlife and human communities those lands and waters support. That's the only way, says Smith, to keep the ESA "ambulances" out of Montana.

"Think of the Endangered Species Act as an emergency room," he says. "It works best when it can address a trauma and stop a species from disappearing. But the goal should be to avoid an emergency. That's why we're advocating preventive care with landowners. It's a lot less expensive to treat an ailment before it becomes an emergency, and that's also true with wildlife species. We want to work with landowners on habitat-scale projects to ensure species stay out of trouble while farms and ranches stay productive. Our goal is to make sure no wildlife species—and no farmer or rancher—ever ends up on the endangered species list in Montana."

Blue Skies for

BLUEBIRDS

DONALDMJONES.COM

Once common, then increasingly rare, Montana's three bluebird species have made a remarkable comeback in recent years thanks to a growing legion of nest-box-building devotees.

BY BECKY LOMAX

They are called bluebirds of happiness for a reason. Many avian species possess lovely songs or vivid plumage, but there's something about bluebirds that inspires unparalleled joy and devotion among their fans. Bluebirders say they love the bird's bright color, enchanting song, association with the countryside, and, perhaps most appealing, tolerance for human presence. Bluebirds, considered among the friendliest of all birds (not to mention harbingers of spring), will often nest near homes and don't even mind having their nest boxes monitored. In songs, poetry, film, and literature, these seemingly carefree cousins to the American robin are associated with happiness, hope, and good times.

"Bluebirds are magical," says Bob Niebuhr, president of Mountain Bluebird Trails, Inc. (MBT), a cavity-nesting-bird conservation group based in Ronan.

A male and female mountain bluebird perch beside a nest box erected along a Montana meadow—prime habitat for the insect-eating birds.

It wasn't long ago that Niebuhr and other bluebird devotees became alarmed as bluebird numbers began declining. Aggressive birds, predators, and the human removal of nesting trees combined to push bluebirds from their traditional habitat. Since then, a small but growing number of bluebird advocates have been working to build and protect nesting sites and reduce threats, restoring the cobalt-colored flyers to both new and traditional sites across Montana's landscape.

Bluebird basics

Montana is one of only a few states to attract all three bluebird species: mountain, western, and eastern. Mountain bluebirds range statewide, western bluebirds are found mainly in the northwestern corner, and eastern bluebirds are confined to the far southeast. Members of the thrush family, all three species are eas-

ily recognized by their blue color. Slightly slimmer than the other two species, male mountain bluebirds are completely blue—and the blue is lighter and more vivid—except for a pale gray underbelly. The male western has a blue throat, back, wings, and belly and an orange chest and shoulders; the male eastern looks similar except the throat is orange and the belly is white. Females of all three species are paler versions of the males.

Bluebirds nest in tree or other wood cavities made by woodpeckers. Daytime ground feeders, bluebirds frequent open areas such as pastures, golf courses, cemeteries, and treeless shortgrass fields to find insects, which comprise most of their diet. Grasshoppers are a favored food.

After wintering in Mexico or the southwestern United States, bluebirds fly north to Montana in late February and early March. (Every year, MBT awards a sweatshirt to the first member sighting any of the three bluebird species in the Treasure State.)

Similar to the behavior of the other bluebirds, the mountain bluebird male establishes his territory, usually encompassing 12 acres, then sings and performs a flight display to attract a female. Often returning to the same site each year, the female builds the nest using grass, exposed plant roots, and hair. She lines it with feathers before laying five to six light blue eggs between late March and May.

The female incubates the eggs for roughly two weeks, after which the chicks hatch. Helpless, blind, and featherless, the chicks mutate immediately into food-demanding monsters requiring three feedings per daylight hour. In May and June, the hatchlings fledge (grow flight feathers) and soon are able to catch their own prey. If bad weather, aggressive birds, or predators don't hinder their attempts, the bluebird pair may hatch a second clutch, which fledges by mid-July.

Freelance writer Becky Lomax lives in Whitefish.

Bluebird threats

In the mid-1800s, house sparrows and European starlings came to North America with immigrants on ships from across the Atlantic Ocean. As these aggressive bird species spread west, bluebirds throughout the New World suffered a housing crisis. Sparrows and starlings take over tree cavities, leaving bluebirds out in the cold. Sparrows even kill bluebird eggs, constructing a new nest on top of a bluebird's. Starlings also threaten bluebirds by consuming the berries bluebirds eat in winter. Unable to adapt to the newcomers, bluebird populations dropped.

Unwittingly, humans worsened the bluebird's demise. Historically, bluebirds thrived in the woodpecker-carved cavities of standing dead trees, called snags. But as more and more people moving into the countryside cut down snags for firewood, those habitats soon disappeared.

"We tend to clean up our world," says Krisri DuBois, coordinator of the Montana Fish, Wildlife & Parks Native Species Program. "If there's a dead tree, people want to cut it down immediately."

Other human-caused threats to bluebirds include widespread use of agricultural pesticides, which kill insects the birds eat, and rural sprawl, which replaces open countryside with fenced backyards and paved driveways.

Hawks, raccoons, weasels, bears, snakes, magpies, crows, jays, and many other predators eat bluebirds. As ground feeders, bluebirds are easy targets. And many predators can easily climb trees and snatch fledglings from a bluebird nesting cavity. Rural cats are especially troublesome. According to the American Bird Conservancy, a single free-roaming cat kills an average of 20 songbirds per year.

Bluebird recovery

Though people had been building and erecting nesting boxes for decades, help formally arrived for Montana's struggling bluebird population in 1974. That's when the late Art Aylesworth of Ronan, known as "the bluebird man," teamed up with bluebird advocates Art and Duncan Mackintosh from Alberta to form MBT. The organization pro-

> "We tend to clean up our world. If there's a dead tree, people want to cut it down immediately."

Eastern bluebird *Sialia sialis*

Mountain bluebird *Sialia currucoides*

Western bluebird *Sialia mexicana*

FROM LEFT: MASLOWSKIPHOTO.COM; BOB MARTINKA; DONALDMJONES.COM

motes bluebird conservation through education, nest box programs, and research. Across Montana, members monitor 6,800 nest boxes, which have produced more than 176,000 bluebirds over the past decade.

The grassroots organization relies on individuals who build their own bluebird nest "trails," a series of at least five boxes placed 100 to 300 yards apart, depending on the species (see sidebar, page 36). The bluebirders monitor nesting and hatching activity, then report their findings to a local MBT or North American Bluebird Society coordinator. Some members oversee hundreds of nest boxes, but most monitor shorter trails of five to ten. The nest boxes are visible on fence lines surrounding open areas, usually on posts roughly 4 feet above ground.

Bluebirds eat insects, which they find in open grasslands and parklands. They feed both on the ground and in the air.

MASLOWSKIPHOTO.COM

To help promote bluebird conservation, Montana FWP has provided MBT with $8,000 in grants over the past two years. The money helps pay for distributing bluebird house plans and building materials to county extension offices. The funds also underwrite educational videos, slideshows, books, pamphlets, and a speaker's bureau. According to Niebuhr, the group gives several dozen presentations in Montana each year, from classrooms to grain- and stockgrower's conventions.

"The response from ranchers and farmers has been great," he says. "In the past three years, we've had 35 new members put up their own bluebird boxes or allowed others to maintain nest boxes on their property."

As testament to how avidly Montanans are working to conserve bluebirds, Ervin Davis of Charlo was named Volunteer of the Year in 2005 by the National Wildlife Refuge System. At the National Bison Range in Moiese, Davis monitors bluebird nest boxes, bands western and mountain bluebirds, and holds education programs.

Coexisting with cattle

Tucker Hughes doesn't build or tend nest boxes. But since 1992 the central Montana rancher has permitted Niebuhr to maintain a trail of nearly 100 of the structures on the ranch's prime mountain bluebird habitat. "Bluebirds are an enjoyable part of the ranch," says Hughes. "And if they eat one fly, it's a benefit."

Cows and bluebirds coexist well. The grazers keep grass short so the birds can find insects, and the birds gobble up annoying flying bugs. According to Niebuhr, a single family of bluebirds will eat 4,000 insects in one summer.

However, cattle can wreak havoc on nest boxes. Ideally, the structures should be placed on the side of a fencepost facing east so that spring blizzards, which usually come from the southwest, don't wallop chicks. But on cattle ranches, the boxes must be placed in line with the fence wire to prevent cows (which rub against anything sticking out from a post) from knocking them down. Hughes laughs as he recalls how Niebuhr lost several boxes to itchy cattle. "Bob learned the hard way," he says.

Another way to help bluebirds, says DuBois, is to leave snags standing. "People who want firewood should cut trees that are already downed rather than felling upright snags that may hold prime nesting real estate," she says. DuBois also urges cat owners to keep their feline pets housebound, on a leash, or within fenced cat runs.

Blue sky future

Niebuhr believes the future of Montana bluebirds looks sunny. "There's increasing interest in bluebirds, attracting people from every walk of life," he says. "Bluebirds are not going to become extinct anytime soon." Membership in MBT alone has tripled in the last four years to more than 600 people hailing from Montana's far corners and out of state. Since 1990, the group's members have helped

Build a BLUEBIRD HOUSE

Building and putting up a bluebird box is a fun and easy project that can make anyone a bluebird conservationist. But there's more involved than just nailing together planks and mounting the box on a fencepost.

"A box that is not monitored or cleaned out is a waste of wood," says bluebird expert Bob Niebuhr of Ronan.

If dead chicks killed by spring storms remain in the box, no bluebirds will renest there. Droppings left in nest boxes can collect fly eggs, which also deter nesting. Boxes need to be cleaned out once each year and kept in good repair.

Anyone installing a nest box should be prepared to monitor the box once a week during the nesting season to clean the nest of blowfly larvae, which can kill chicks, and remove the nesting material once the birds have fledged.

Nest boxes should be built according to specifications established by experienced bluebirders. Most important: They must open easily for cleaning.

"I've seen some you couldn't open with dynamite," says Niebuhr. "The sentiment is right, but reality is something else."

Also, the hole size has to be small enough to keep starlings out but large enough to allow bluebirds in. Place the box in open, shortgrass areas away from trees, shrubs, wetlands, and ponds. If too close to these other habitats, wrens or swallows may nest in the box.

To make a western bluebird trail, place five nest boxes 100 yards apart. Place them 100 to 125 yards apart for easterns, and 200 to 300 yards apart for mountains.

Bluebird box

Use ¾" cedar

Roof	7" x 8"
Roof cleat	½" x 6½"
Front	7" x 10"
Back	7" x 18"
Floor	5¼" x 5½"
Side	5¼" x 12"

(angle to 10" in front)

Entrance hole: 1⅛"

(Hole size must be exact. If the hole is even slightly larger, European starlings can enter the box)

Wire to hold removable roof: ⅛" diameter.

MOUNTAIN BLUEBIRD TRAILS, INC.

parent birds produce an average of roughly 18,000 bluebirds each year, twice what it averaged in the 1980s. Federal North American bird surveys have shown a steady increase in bluebird populations in Montana and other states over the past 25 years.

One indication of the growing energy behind bluebird conservation is the publication of an updated version of the bluebird "bible." Bluebirders consider Myrna Pearman's *Mountain Bluebird Trail Monitoring Guide* an indispensable booklet. The slim guide is packed with bluebird facts and directions on how to build boxes and maintain a bluebird trail. Pearman, an Alberta biologist, also provides contact addresses and clarifies current laws and regulations regarding bluebird trail monitoring.

"Bluebirds aren't pets," she says. "Regulations exist for what can and cannot be done legally." As is the case for other migratory birds, all three bluebird species are protected under the Migratory Bird Protection Act. Though bluebirds can become accustomed to humans, she says, it is illegal to handle them without a permit.

Pearman sees bluebird conservation as a growing grassroots activity in Montana and Alberta. "The future of bluebirds is fairly secure. More and more people are getting involved, and nest box programs are helping local bluebird populations."

Considering how much joy bluebirds bring to people across this region, that's news to put a smile on anyone's face.

A $15 family membership in Mountain Bluebird Trails gets you a copy of Myrna Pearman's guide as well as supplies for starting nest boxes. You can reach MBT at mountainbluebirdtrails.com or (406) 676-0300, the North American Bluebird Society at nabluebirdsociety.org or (866) 517-4483, and the American Bird Conservancy at abcbirds.org or (540) 253-5780.

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Under federal permit, an MBT member measures a fledgling. An eastern bluebird female ponders which of her insistent young to feed next.

MASLOWSKIPHOTO.COM

McCown's Longspur

Calcarius mccownii

By John C. Carlson

ALAN G. NELSON

All prairie and plains birds have evolved unique ways of projecting their songs in the windy, open environment. But McCown's longspurs have a particularly stylish and captivating way of delivering their distinctive territorial tune. Rising from the open, dry prairie, the male pushes himself high into the sky with deep strokes of his long wings. Reaching the zenith, he pitches his wings back, locks them straight out, and begins to sing *see see see me see me hear me hear me see.* Floating downward through the wind like a feathered parachute, he continues singing until reaching the ground, when he heads back into the sky to begin the territorial display all over again.

APPEARANCE

Male McCown's longspurs are light gray with a white face, black cap, and black "mustache." They have a wide black band across the breast set off with a chestnut shoulder patch. In shades of brown, the female is a paler version of the male. The tail of both sexes is white, with a "T" formed by a black central tail feather and the black tips of the outer tail feathers.

REPRODUCTION

The males arrive in Montana in late April from the high plains of the American Southwest and begin setting up territories. When females arrive a short time later, courtship begins. On the ground, the male prances in a circle around the female, occasionally raising his wings straight into the air to flash the white lining, all the while pouring forth an ecstatic song. After the female chooses her mate, she builds a grass nest in a small depression in the ground. Usually around mid-May, she lays three or four white eggs with heavy brown or purplish brown markings. She incubates the eggs for 12 days, and the nestlings leave the nest 10 days after hatching. McCown's longspurs primarily eat grasshoppers during the summer and feed on grass and weed seeds during the winter.

HABITAT

McCown's longspurs are birds of grasslands with very little grass. Historically, this type of mostly barren grassland was found in patches throughout the North American interior. Certain types of soils, heavy grazing by bison and locusts, periodic wildfire, and severe drought combined to create patches of short sparse grass. As bison were killed, locusts reduced, and fires tamed, most of the prairie bald spots disappeared, and with them most McCown's longspurs. However, because occasional droughts continue and the special soils remain, the birds still have remnant breeding habitat in open prairie characterized by buttes, gumbo, short grasses, and prickly pear cacti.

RANGE

McCown's longspurs historically bred throughout the prairies of the northern Great Plains, from Minnesota west to the Rocky Mountain Front, north into prairie Canada, and south to Wyoming and Oklahoma. Due primarily to the conversion of prairies to agricultural fields, the species is no longer found in Minnesota, Manitoba, or Oklahoma, and distribution is limited in the western Dakotas. Montana appears to be the species' remaining stronghold. McCown's longspurs are found throughout the state's eastern half, in appropriate habitat, as well as in high, sparse grasslands in mountain valleys of Montana's southwestern region.

MANAGEMENT

McCown's longspurs are a species of concern in Montana and are on the national watch list of species that have the potential to become federally listed as threatened. Converting native prairie to cropland can reduce McCown's longspur populations. The transcontinental Partners in Flight bird management plan recommends that the best way to conserve McCown's longspurs is to preserve native shortgrass prairie, especially in areas of sparsely vegetated hills.

John C. Carlson is a wildlife biologist for the federal Bureau of Land Management in Glasgow.

STILL ON THE BRINK

The federal Endangered Species Act was created in 1973 to prevent the extinction of animals such as the black-footed ferret, the rarest species in North America. To learn why the ESA appears to be working, though perhaps not as its authors intended, see our story on page 26. Photo by Andy Long.

Montana Outdoors

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